FLIGHT

MAGAZINE

FEBRUARY 1958
50 cents

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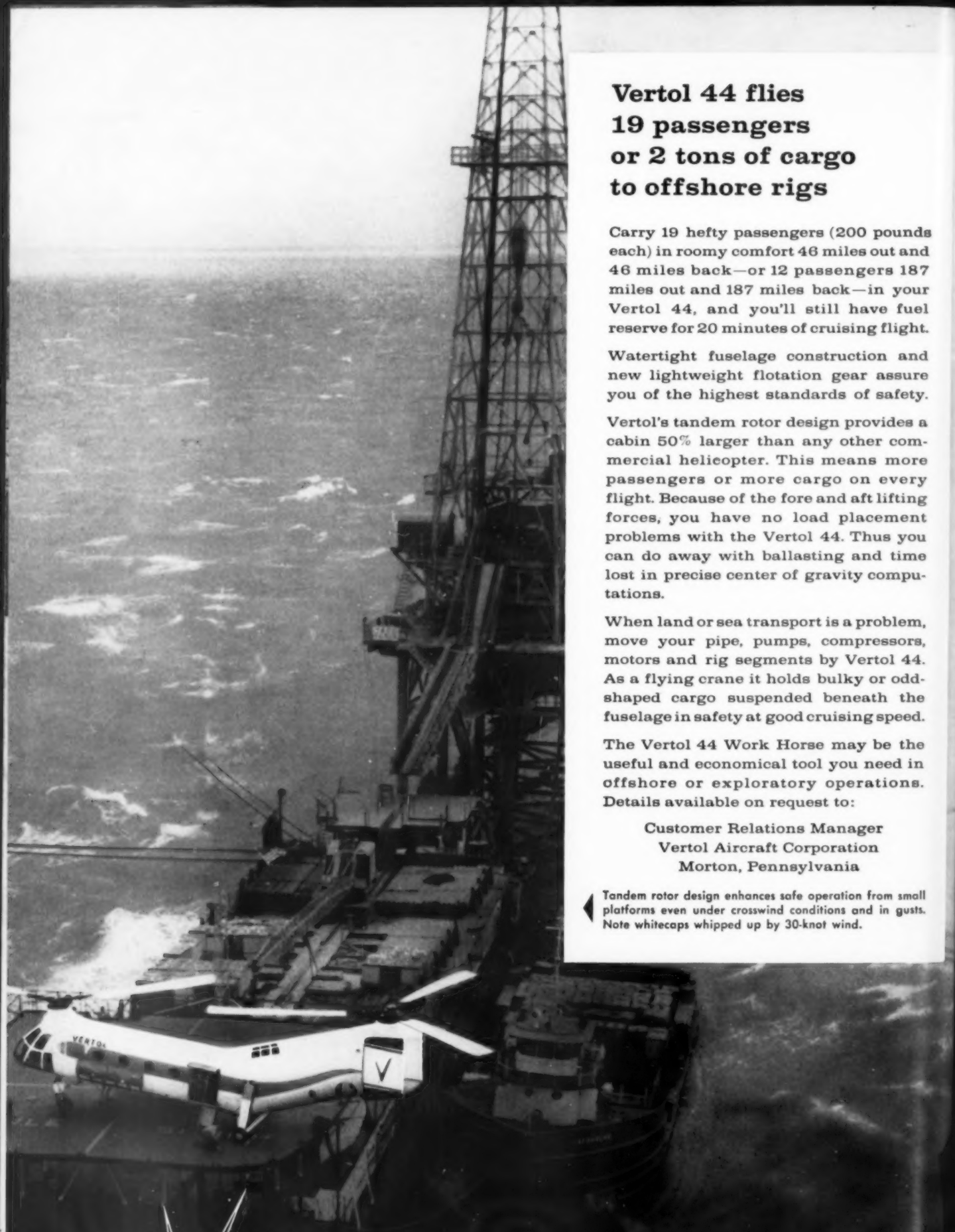
DETROIT

ALTI-CRUISER WITH PRESSURIZED CABIN

See page 22



Vertol 44 flies 19 passengers or 2 tons of cargo to offshore rigs

Carry 19 hefty passengers (200 pounds each) in roomy comfort 46 miles out and 46 miles back—or 12 passengers 187 miles out and 187 miles back—in your Vertol 44, and you'll still have fuel reserve for 20 minutes of cruising flight.

Watertight fuselage construction and new lightweight flotation gear assure you of the highest standards of safety.

Vertol's tandem rotor design provides a cabin 50% larger than any other commercial helicopter. This means more passengers or more cargo on every flight. Because of the fore and aft lifting forces, you have no load placement problems with the Vertol 44. Thus you can do away with ballasting and time lost in precise center of gravity computations.

When land or sea transport is a problem, move your pipe, pumps, compressors, motors and rig segments by Vertol 44. As a flying crane it holds bulky or odd-shaped cargo suspended beneath the fuselage in safety at good cruising speed.

The Vertol 44 Work Horse may be the useful and economical tool you need in offshore or exploratory operations. Details available on request to:

Customer Relations Manager
Vertol Aircraft Corporation
Morton, Pennsylvania

Tandem rotor design enhances safe operation from small platforms even under crosswind conditions and in gusts. Note whitecaps whipped up by 30-knot wind.

VERTOL Aircraft Corporation

MORTON, PENNSYLVANIA

Learstars

fly the polar route...
No other business aircraft can!

On November 10, 1957, a standard twin-engine production model LEARSTAR was flown from PacAero's assembly line in Santa Monica, California, over the Frobisher polar route for delivery in Dusseldorf, Germany. One stop for refueling was made. No special equipment.no auxiliary fuel tanks were carried. This 22 hour, 58 minute polar flight is typical of LEARSTAR safety, performance and ability—approached by no other business aircraft and matched by only three commercial airliners.

LEARSTAR is the only business aircraft in its class licensed in AIRLINE TRANSPORT CATEGORY CAR 4b.

PACAERO ENGINEERING CORP. PacAero

A Subsidiary of Pacific Airmotive Corporation

3021 AIRPORT AVENUE, SANTA MONICA, CALIFORNIA • EXmont 1-5281

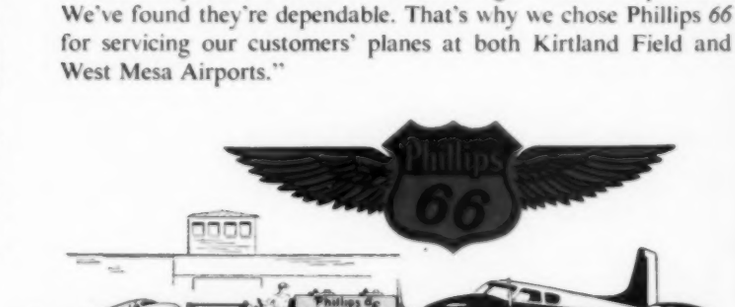
Air Headquarters in "The Land of Enchantment"

W. P. CUTTER, president of the Cutter-Carr Flying Service, is one of the Southwest's best known aviation personalities. He is a member of the OX-5 Club and is a QB. Hobbies include hunting and fishing from Alaska to Mexico. He is also an accomplished amateur artist and is shown above with one of his paintings.

In the great wide open spaces of New Mexico, where the airplane is rapidly replacing the cow pony, Cutter-Carr Flying Service of Albuquerque is headquarters for a growing number of air travelers.

With operations at both Kirtland Field and West Mesa Airport, Albuquerque's two major airports, Cutter-Carr offers complete attention to the pilot's needs . . . from storage and servicing to complete major overhaul and radio repairs and installations in its Beech-approved shops. This aggressive dealer is also recognized as one of the largest charter-flight and air ambulance operators in the country.

Cutter-Carr has used Phillips Aviation Gasoline exclusively for more than 15 years. W. P. Cutter, president, says: "We use Phillips *66* aviation products in our own charter flights whenever possible. We've found they're dependable. That's why we chose Phillips *66* for servicing our customers' planes at both Kirtland Field and West Mesa Airports."



AVIATION DIVISION • PHILLIPS PETROLEUM COMPANY • BARTLESVILLE, OKLAHOMA

AIRCHILD VTOL FOR ARMY has ur propellers and uses vectored slip- ream for vertical take-off and land- g. The small aircraft has a large r intake for a turbine engine in the selage. It will fly later this year. airchild is developing it under con- act for the Army's Transportation, esearch and Engineering Command.
—(Fairchild Sketch.)

AIR Report
Significant Trends and News

CESSNA CONTINUES CHALKING UP GAINS over last year, newest development being another Army purchase last month of $4,500,000 worth of L-27 twin-engine 310's. Cessna's first quarter sales of its new fiscal year topped $20,000,000, up 38% over sales for the same 1957 period. Earnings were up to $2.01 per share as compared to $1.10 last year. Cessna, however, chose to write off all of the remainder of its multi-million-dollar loss on the discontinued 4-engine Model 620 project in the first quarter and this brought the period's earnings down to only 63 cents per share. But at the same time, Cessna stock dividend was increased from 35 cents to 40 cents per share per quarter, first dividend boost since April, 1956. Dwane Wallace, president, expects to top $80,000,000 in sales for 1958, an increase of 15%, and says profits will equal or exceed last year even after absorbing all of the Model 620 loss.

McDONNELL AIRCRAFT HAS MULTI-TURBINE HELICOPTER for commercial market. It is powered by three small turbo-jets and has one-engine-out performance. First commercial purchaser probably will be Petroleum Helicopters of New Orleans, which services off-shore drilling rigs with copters.

DRY-TANK FAILURE OF BOTH ENGINES ON TAKE-OFF caused crash landing of Aero Design's first Alti-Cruiser at Norman, Oklahoma, last month. Chief Test Pilot Clay Pape and Vice President Ted R. Smith were not seriously injured and the accident has had no effect on production or delivery schedules. Distributors and writers who were shown the airplane the next morning were impressed by its structural integrity in absorbing the impact forces involved, the cabin interior showing no evidence of damage.

BONANZA AIR LINES HAS DOUBLED ITS ORDER FOR FAIRCHILD F-27 PROPJET AIRLINERS and will receive six of the Friendships instead of three as originally planned.

(Continued on page 8)

FLIGHT MAGAZINE

FEBRUARY, 1958 VOL. 47, No. 2

THIS MONTH'S COVER pictures the new Alti-Cruiser announced last month by Aero Design & Engineering Co., manufacturers of the Aero Commander. The Alti-Cruiser is the world's first light-twin business plane with pressurized and air-conditioned cabin and provides occupants a sea level cabin up to 5,000 ft. with a 9,000-ft. cabin while flying at 15,000 ft. for optimum performance from its two 340-hp. supercharged Lycomings. Available in 4-6-place versions, the Alti-Cruiser has a 260-mph. top speed and 230-mph. cruising speed.
—(Aero Design Photo by Wayne Entriken.)

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager; LOUISE ROBERTSON, Circulation; E. H. PICKERING, Consultant; P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas — Telephone TAylor 3-6191.

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Get there FAST in a '58 Beechcraft Bonanza

. . . FIRST with fuel injection

'58 BONANZA'S NEW ENGINE WITH FUEL INJECTION

GO FARTHER—FASTER

The four-place *Beechcraft* Bonanza
RANGE — up to 1,060 miles nonstop
SPEED — up to 210 miles per hour

Tomorrow's power — fuel injection — is yours today in the New Beechcraft Bonanza for '58! For the first time in commercial aviation, the magic of fuel injection gives smoother performance and 200 miles per hour cruising speed with the Bonanza's new 250 horsepower engine.

Now you can go faster, get there earlier, get more done than ever before. And you'll enjoy the supreme quiet and comfort of the Bonanza cabin as you watch the miles hurry by.

The '58 Beechcraft Bonanza is at least 30 miles per hour faster than any other single-engine commercial airplane. This rugged and right airplane uses less fuel than your family car, and no airplane is easier to fly!

Beechcraft

For information about the **Bonanza** and the finest leasing and financing plans in aviation, see your Beechcraft distributor or dealer, or write Beech Aircraft Corporation, Wichita 1, Kansas, U. S. A.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

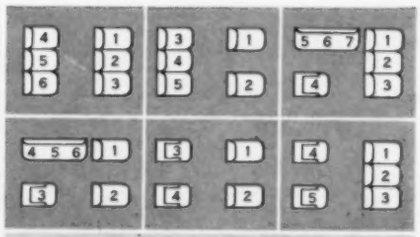
RUGGED AND RIGHT...HIGH STYLED AND HANDSOME

the Beechcraft Twin-Bonanza for '58

You get more of everything in the New Beechcraft Twin-Bonanza for '58 — more power, more speed, more comfort, more beauty, more rugged and right construction — than in any other twin-engine airplane in its field!

With a Twin-Bonanza you save three ways —in time, in money and in energy. From lower maintenance costs to higher resale value, this top performer is not only worth more when you buy it but also worth more while you keep it.

outstanding single-engine performance



your choice of comfort... six luxurious interiors — seating four to seven persons.

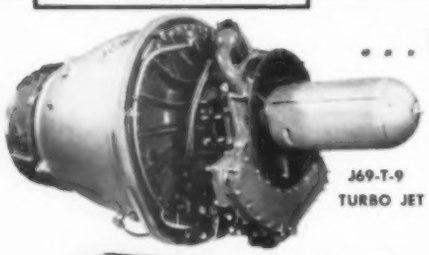
The six-place *Beechcraft* Twin-Bonanza
RANGE – up to 1,650 miles nonstop
SPEED – up to 240 miles per hour

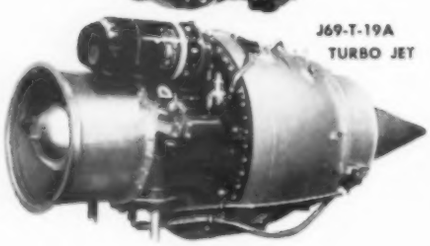
Beechcraft

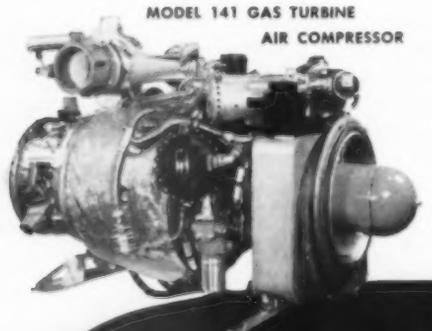
For information about the **Twin-Bonanza** and the finest leasing and financing plans in aviation, see your Beechcraft distributor or dealer, or write Beech Aircraft Corporation, Wichita 1, Kansas, U. S. A.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

THESE ENGINES ARE NOW IN PRODUCTION AT C. A. E.


J69-T-9 TURBO JET


J69-T-19A TURBO JET


MODEL 141 GAS TURBINE AIR COMPRESSOR

... the T-37 Twin Jet Trainer with C. A. E. Turbine Power

Air Corps flight training routine took a significant step forward recently, when the T-37 twin jet trainer entered its Phase VIII testing at Bainbridge Air Base, Georgia. Twenty hand-picked officers embarked on a course known as PROJECT PALM, with the two-way goal of training for them, and suitability testing for the plane. This new high-performance ship advances the jet phase of fliers' training to an earlier stage in the training schedule, speeding the transition from propeller-driven planes to jets, with gains in both safety and economy. Twin J69-T-9 turbines by C.A.E. provide the power.

CONTINENTAL AVIATION & ENGINEERING CORPORATION
12700 KERCHEVAL AVENUE, DETROIT 15, MICHIGAN
SUBSIDIARY OF CONTINENTAL MOTORS CORPORATION

AIR REPORT

(Continued from page 5)

Deliveries scheduled for early 195 have been delayed until this fall.

BEECH ACCEPTANCE CORPO RATION, wholly-owned subsidiary f Beech Aircraft, handled over $10,000 000 worth of aircraft financing for i outlets and customers last year a has financed over $21,000,000 worth f Beechcrafts since it began operati two years ago. The firm operates s x different retail finance plans and a leasing plan in addition to a floor pla for demonstrators. Used as well s new Beechcrafts are covered.

LOCKHEED'S TWIN-JET LIGHT EXECUTIVE TRANSPORT has ma le a single-engine take-off from a stand-ing start and climbed to 20,000 ft. on the one engine. The feat is the latest accomplishment of the 10-passenger prototype in more than 100 hrs. of comprehensive company testing. It features two Bristol Orpheus 1/5 jet engines, mounted on the fuselage near the tail. Twice during testing the Jet-star has been flown to ranges of 1,725 miles with ample fuel reserves on landing. The single-engine take-off from standing start was from a runway at an elevation of 2,200 feet above sea level. It has flown repeated-ly on one engine above 20,000 ft. On both engines, it has reached 45,000 ft. within 30 minutes after take-off with full load. Maximum cruising speed ap-pears to be in the 550-600-mph. range with 500 mph. being given as its speed for optimum economy. Lockheed will produce the Jetstar only if ordered by the military. It would then offer a commercial version.

(Continued on page 58)

BIRDS OF A FEATHER demonstration is furnished by this photo of an Army Sikorsky H-34 hoisting a damaged Army Hiller H-23 trainer from an otherwise inaccessible spot near Camp Wolters, Texas, and the Army's Primary Helicopter Flight School. Left in the isolated spot after a forced landing, the Hiller would have been dismantled for removal without the aid of the Sikorsky.
—(U. S. Army Photo.)

TRECKER AIRCRAFT CORPORATION

GENERAL MITCHELL FIELD • MILWAUKEE • WISCONSIN

NOW..

1,200 HOURS*

BETWEEN MAJOR
OVERHAULS FOR THE

BELL

*EQUAL TO 100,000 MILES..

FOUR TIMES AROUND THE WORLD!

Bell . .world's most experienced helicopter . . leads again! Because of its outstanding and proven service record, the famous Bell Model 47 series** has been approved for 1,200 hours of operation between major overhauls. This is twice the previous interval . . more than any helicopter.

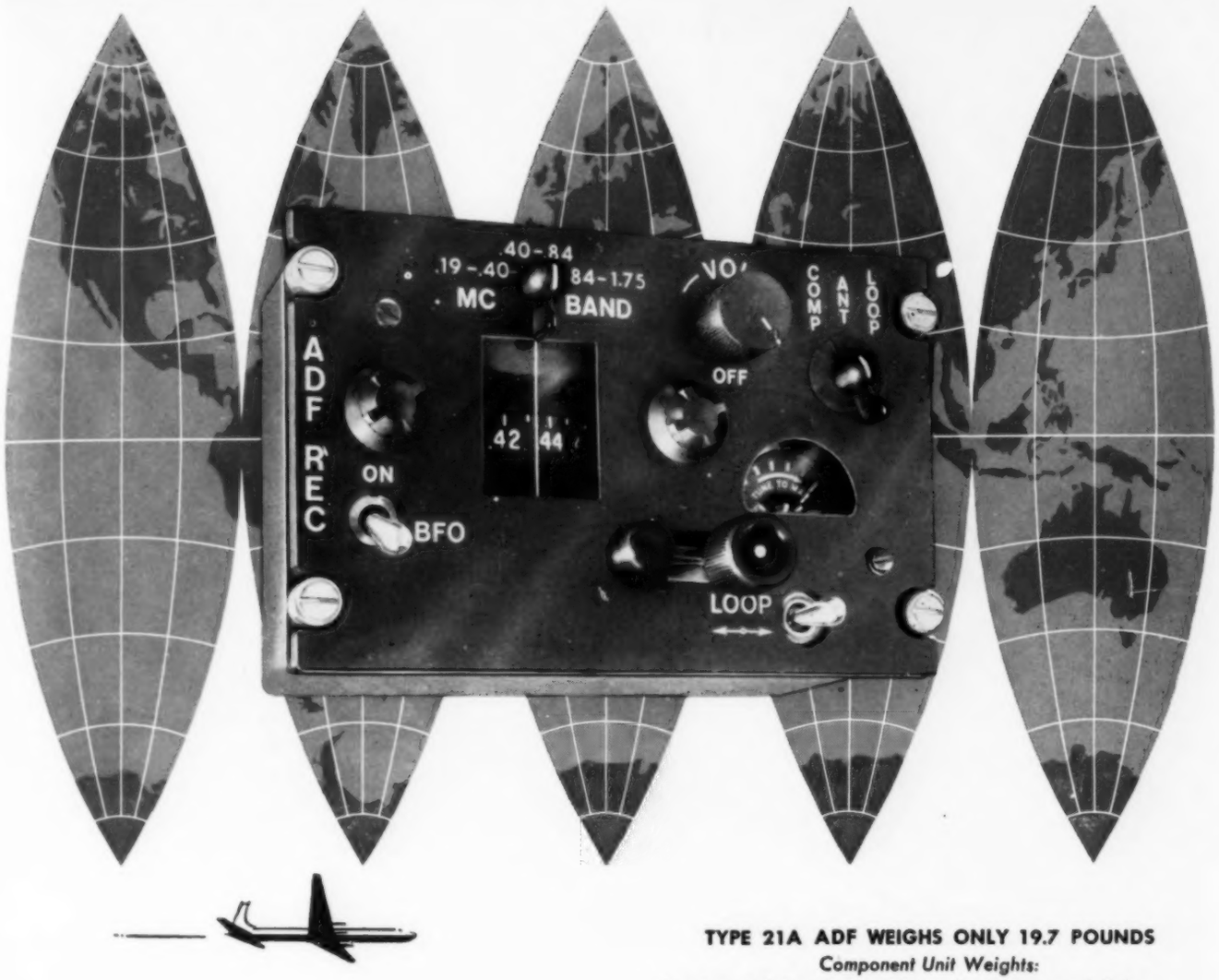
This means a substantial reduction in maintenance hours, plus greater availability and use of the helicopter. It means that one man can do the work of two on minor inspection and repair.

Bell helicopters have passed the test of time with more than 2,500,000 hours of actual flight time in 52 countries of the world. Now, with time between major overhauls doubled, Bell proves once again that it is the undisputed leader in the field of utility helicopters.

**Bell Model 47 series helicopters approved for extended operation include the 47G and 47G-2. Military versions of these models are the Army and Air Force H-13G's and H-13H's and the Navy HTL-6's.

BELL Helicopter CORPORATION

FORT WORTH, TEXAS



TYPE 21A ADF WEIGHS ONLY 19.7 POUNDS

Component Unit Weights:

Receiver, 6.8 lbs.; Loop, 4.3 lbs.; Loop Housing, 0.5 lbs.; Indicator, 1.3 lbs.; Control Unit, 1.6 lbs.; Power Unit, 5.2 lbs.;
CAA Certificate No. 1R4-9 U.S. Military: AN/ARN-59
British Certificate of Approval VC-78

World-Wide navigation aid

The Time Tested ADF Now in Less Weight, Less Space

The ADF is a basic air navigation instrument, used in all parts of the world, turnable to some 60,000 transmitters. But the important thing now about the ADF is that ARC has engineered an ADF system down to less than 20 pounds in weight, with a comparable saving in space.

Now pilots enjoy the advantages of dual installations of this compact miniaturized equipment in tolerable weight and space requirements.

The ARC Type 21A ADF is built to today's more critical speed and environmental demands. It has hermetic sealing of vital components, such as the entire loop assembly. It covers all frequencies from 190 kc to 1750 kc . . . operates on only 2.8 amps at 27.5 volts dc input or equal power at 13.5 volts. A significant feature is the extremely low loop drag—only two inches outside the aircraft skin.

Ask your dealer for detailed literature.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation BOONTON, NEW JERSEY

Omni/Loc Receivers • Course Directors
LF Receivers and Loop Direction Finders • UHF and VHF Receivers and Transmitters (5 to 360 channels)
10 Channel Isolation Amplifiers • High Powered Cabin Audio Amplifiers • Interphone Amplifiers • Omnirange Signal Generators and Standard Course Checkers • 900-2100 Mc Signal Generators

ARC

New Addison Airport is now open for executive, business and private aircraft

You're always cleared to land at Addison Airport, because Addison is away from congested traffic patterns. You save time, getting on the ground quickly, and when you are on the ground, you'll find service is fast and friendly. Gasoline trucks are operated from the Terminal building by two-way radio for extra quick service.

Addison Airport's runways are planned for use in almost every kind of weather condition. The principal, hard-surfaced runway is 4,500 feet long, 100 feet wide, and is on headings of 150 degrees and 330 degrees—ideal for the prevailing winds in the Dallas area. Also, there is a second cross-wind runway 3,200 feet long and 200 feet wide. This hard packed sod runway has headings of 30 degrees and 210 degrees and will handle equipment as large as DC-3's.

At the modern, completely air-conditioned Terminal building, you'll enjoy the comfortable lounge, clean restrooms, and a coffee shop for snacks or full meals. Rent cars and taxis are available to transport you quickly to downtown Dallas.

At the new Addison Airport, you'll find Humble top-quality aviation fuels and lubricants quickly available. Humble aviation products are produced by the most modern of refining procedures, and they are continuously improved to keep pace with the rapid advances in modern aircraft engines. When you refuel at Addison Airport, or at any airport displaying the Humble sign, you can be sure that you're getting the best in aviation fuels and lubricants.

HUMBLE

AVIATION PRODUCTS

HUMBLE OIL & REFINING COMPANY

Carl V. "Red" Darnall
PREFERS PIPERS

Veteran pilot Carl V. "Red" Darnall, owner of the Darnall Flying Service, Glasgow and Kalispell, Montana, prefers the Piper PA-18-A for his extensive aerial spraying. Wheat—one crop per year—is the principal crop in northern Montana and Mr. Darnall sprays an average of 10,000 to 12,000 acres of wheat a season in each of his Piper agricultural planes. Control of weeds and grasshoppers in the wheat growing area accounts for 95 percent of his spraying activities. The result is the saving of many thousands of dollars for Valley County wheat farmers.

Mr. Darnall, who has flown 19,000 hours since he started flying in 1928 (he holds license #5253), has flown every type of aerial applicator. Of the Piper PA-18-A he says: "I much prefer the Pipers for my operation . . . consider them indispensable, in fact. For short field spraying, landings and take-offs from rough roads, for speedy loading of chemicals and laying an effective spray pattern, the PA-18-A is the best airplane there is."

Training pilots in aerial spraying is another aspect of the Darnall Flying Service operation. Commercial pilots from all parts of the United States have attended the 10-hour training course in the technique of flying a loaded airplane, making proper turns, landing and taking off from improvised strips, and also the use of herbicides and their effects. Naturally, the PA-18-A is the plane Mr. Darnall prefers for this exacting kind of pilot training.

YOU, TOO, CAN PROFITABLY USE THE PIPER PA-18-A IN YOUR SPRAYING OR DUSTING PROGRAM

The PA-18-A, factory equipped for spraying, dusting or both, is the most widely purchased agricultural airplane in the world. With 150 horsepower Lycoming engine, the PA-18-A has a capacity of 110 gallons of spray or 18 cubic feet of dust. Equipment is quickly convertible for dusting or spraying operations. High payload, extremely short take-off and landing capability, excellent visibility, good slow-flight characteristics, exceptional safety and minimum maintenance — these are the features that make the PA-18-A the favorite of experienced applicators throughout the U.S. and in 40 other countries. For new full-color brochure, write Dept. 14-F, PIPER AIRCRAFT CORPORATION, LOCK HAVEN, PENNSYLVANIA.

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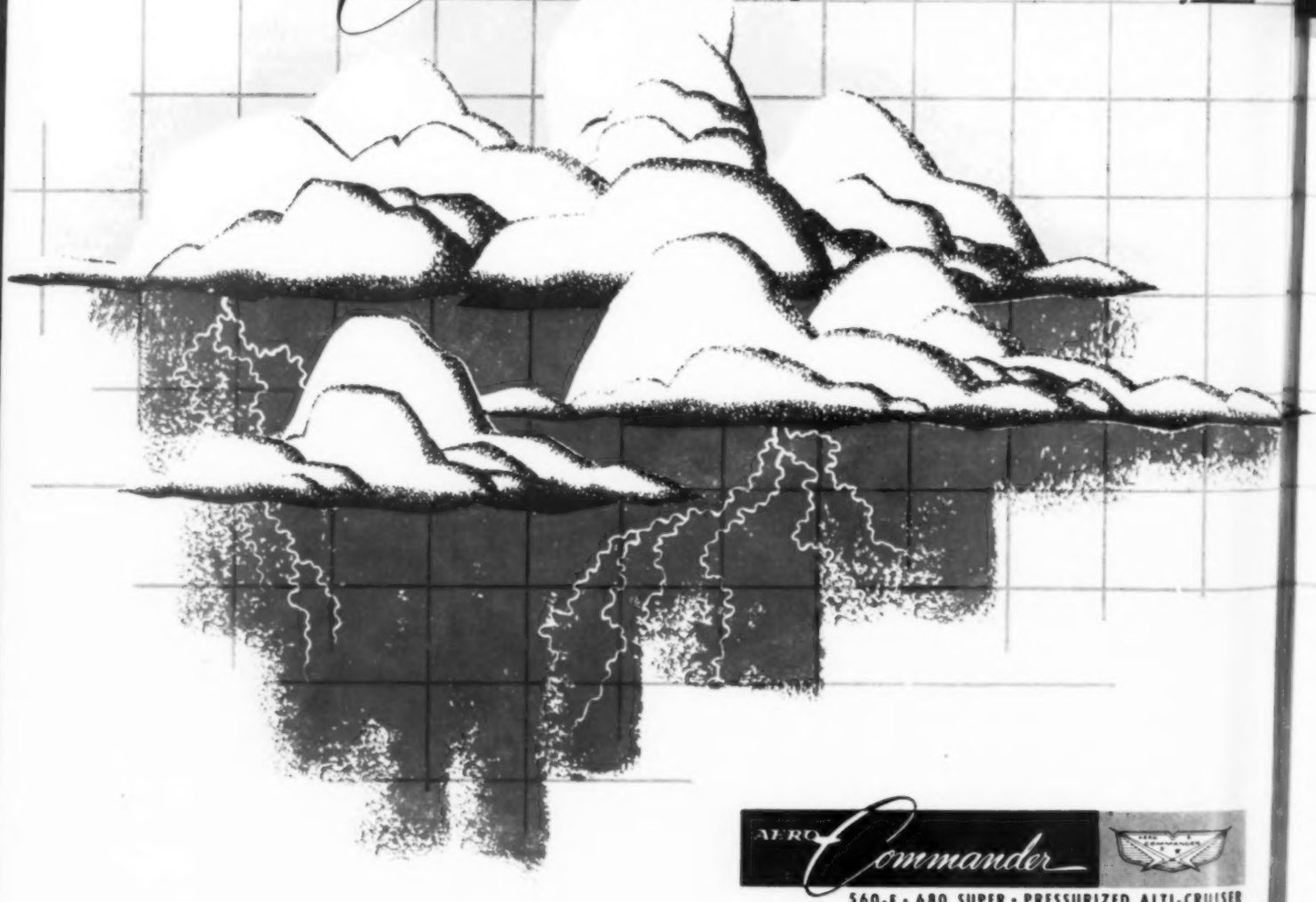
AIRCRAFT CORPORATION
LOCK HAVEN, PA.

MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

HIGH COMFORT

AERO Commander presents the world's first



AERO Commander

560-E • 680 SUPER • PRESSURIZED ALTI-CRUISER

AERO DESIGN & ENGINEERING CO

NEW AIRLINE COMFORT

Airline-type pressurization in the new Commander Alti-Cruiser makes altitude flying a comfortable reality in executive aircraft. The Alti-Cruiser heralds a new era of utilization for the company airplane! Favorable cruising altitudes can be maintained in complete comfort—without oxygen masks.

NEW ALL-WEATHER SAFETY

Now the executive team can fly safely over weather and out of congested traffic patterns in complete comfort—in the Commander Alti-Cruiser.

NEW MAXIMUM PERFORMANCE

At 15,000 feet, the pressurized, supercharged Commander Alti-Cruiser delivers maximum cruise performance with economy of operation. And yet, passengers enjoy the comfortable cabin altitude of an airplane flying thousands of feet lower.

PRESSURIZED *light twin business aircraft*

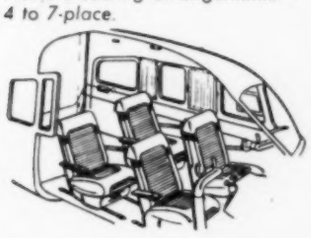
THE NEW SUPERCHARGED

AERO Commander ALTI·CRUISER

With All-Weather Air Conditioning

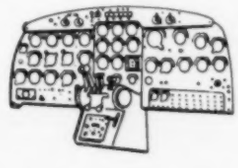
OPTIONAL LAVATORY COMPARTMENT AND EXCITING NEW INTERIORS

Flexible seating arrangements—4 to 7-place.



Complete lavatory compartment —optional

Deluxe airline-type reclining chairs with tuck-away arm rests.



New control quadrant and panel for greater operational efficiency.

Write for Aero Commander's new "Tailored for Business" Lease Finance Plan

T LAKES AIRPORT • BOX 118 • BETHANY, OKLAHOMA

Flyers Agog at Spectacular New Terminal

Crews and passengers unload conveniently at front door. Main lobby, VIP office, flight ops room downstairs; Flight Deck Restaurant, coffee shop on second floor.

Luxuriously-furnished main lobby features oak paneling, terrazzo floor, colorful view of ramps and runways. Adjacent flight ops, rent cars, and restaurant.

BIZ AVIATION'S TOP SHOWPLACE WINS APPROVAL

The day Southwest Airmotive opened the doors, its new business and military flying terminal became the scene of unrehearsed drama and happy human emotion.

Beauty and Comfort

A pretty mink-swathed lady who'd flown into many an airport with her pilot-husband dashed about breathlessly inspecting the plush SAC layout. She summed up everyone's reaction when she sank at last into a deep chair in the lobby and said, simply: "Ahhh-hhhhhhh."

Fine Restaurant

An oldtime executive pilot was overwhelmed by the flight ops room and related etceteras and just frankly couldn't believe it all.

"It's great," he said. "But where's the catch – what'll it cost me to use all this?"

He nearly split his leathery face wide-open grinning when told, "Nothing — nothing at all, podner."

When the manager of the second floor Flight Deck Restaurant first saw the night-time view out his great panoramic window, he sat down almost reverently and said, "Where have I been all my life? What a place to eat!"

Flight Operations

The top VP of a firm making new business planes cancelled an appointment, spent an hour taking it all in, then observed:

"We've arrived — and I don't mean just Southwest Airmotive. All of us in business aviation Have Now Arrived."

Now, we want to know what YOU will say. Come take a look — we predict you'll say plenty.

Southwest Airmotive Co.

LOVE FIELD, DALLAS

DISTRIBUTION DIVISIONS: KANSAS CITY • DENVER

1932 —— A QUARTER CENTURY OF LEADERSHIP —— 1958

Just among ourselves

From Doughnuts to Dollars

ONE of the most refreshing conventions to come our way in recent years was the 10th annual meeting of the Helicopter Association of America, held last month near Ft. Worth. Host was the Bell Helicopter Corporation, an organization that has gained an enviable reputation for doing everything it undertakes properly, with efficiency and dispatch. Bell's participation had a lot to do with the success of the helicopter meeting that set a new high in accomplishment and productivity insofar as rotary-wing interests are concerned.

The Association membership consists largely of commercial helicopter operators who engage in everything from offshore drilling, pest control and aerial survey work to towing and transportation jobs which require the peculiar capabilities of the helicopter. While the total number of operators is not an imposing figure the list is growing as is the constantly expanding number of new uses for the whirly birds. One thing quite obvious at the meeting — the operators are all making money now that the modern helicopter has emerged from being primarily a complex vehicle that only the military could afford. Today it's a simplified commercial machine in the workhorse category to be operated for profit.

While most of the Helicopter Association members are pioneers in the truest sense of the word, many having started out some years ago with an unknown machine in an unknown market, the day of pioneering is about over. As one industry spokesman said during the convention sessions: "This year marks the beginning of a real commercial helicopter industry. There need be no more doubt about the future for commercial helicopter operations."

After talking with the operators and probing deep into their business we must agree that the commercial helicopter has arrived and the future looks brighter than ever before. Sales departments have been strengthened, service and parts availability expanded and constant mechanical improvements keep extending the trouble-free hours between overhauls. The operators and potential customers now have a good range of craft to choose from as more and more attention is being paid to the commercial market by the helicopter manufacturers.

The on-again, off-again military business has kept the helicopter industry in a constant state of flux from chicken one day to feathers the next. While complete stability within the manufacturing end of the business still must come from hoped-for long-range procurement policies in the Pentagon, it is quite obvious that a healthy commercial helicopter industry now a-budding can do much to cut down dependence on the military for total economic security of our helicopter makers. The rugged commercial helicopter operators out in the field are hastening the day when dependence on military orders will end.

Formula for Business Aviation

WE salute George Pew and his Aero Design & Engineering personnel for their courage and determination in developing their new Alti-Cruiser, the world's first airplane designed for business flying to come off the production lines with a pressurized and air-conditioned cabin.

The Alti-Cruiser opens a whole new realm for business plane utilization because it provides the corporate flying executive his first genuine opportunity to take advantage of higher flight levels and all they offer to performance and travel efficiency in light twin-engine aircraft. These advantages frequently can mean the difference between making an important trip or not making it — they add greatly to the light twin's value as a useful, workaday vehicle. This value will not only make possible more flying by corporations already engaged in private air travel but will encourage more firms to acquire and operate aircraft of their own.

Here is genuine progress, a significant stride forward which should carry business aviation as a whole and Aero Design in particular farther in their march to industry greatness. It took outstanding ability on the part of Ted R. Smith and his Aero Design research and development staff to perfect the Alti-Cruiser. They have devoted two years to the project, which was a well-kept industry secret. It also demanded unlimited faith and confidence in the business on the part of George Pew, Aero Design president, and his associates to support this kind of expensive research and development with the investments and facilities necessary to carry such a project through to success. This has been what the giants in the aircraft industry refer to as a "private venture" — it had no support in the way of military funds or promises. It was simply a process of an ambitious, successful and courageous enterprise putting its best efforts and limited resources into a development for which a market demand had been foreseen. This is the success formula which business aviation needs now more than ever. We salute Aero Design for its many accomplishments and contributions to aviation progress, of which the significant Alti-Cruiser is the latest example.

Profit Squeeze

THE domestic airlines are in trouble because the Civil Aeronautics Board has not faced up to the facts of life and granted fare increases commensurate with the rising operating expenses which are going up faster than revenues. Net profits for 1957 were less than half the 1956 profit. Once the envy of the world, the U. S. air transportation system is threatened with deteriora-

(Continued on page 60)

The Federal Tubeless Autopilot,
a new concept in Freehand Flight, is a complete autopilot with all the "hands off" benefits for radio navigation, computing, writing, communications, chart references and other routine cockpit activities in rough air, IFR and increasing airways complexities.
Federal's "new concept" gives you a true 3-axis autopilot in every sense of the word! Simple, straightforward, trouble-free electromechanical design for highest reliability and lowest maintenance assures easiest "set up and go"–"ready to get up and go" features that free you – and minimize adjustment, maintenance and down-time costs and delays!
Remember – the most valuable extra hands you can have in the cockpit are your own – set them free from "control-clutching" fatigue to handle cockpit jobs easily, accurately, without hurry – with Federal!
make it
BUSINESS and PLEASURE
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Freehand Flight!
Want to Know More – See Newest Federal Tubeless Autopilot Features and Facts?
Write for free brochure, "Freehand Flight," Industrial Products Division, International Telephone and Telegraph Corporation, 15191 Bledsoe Street, San Fernando, California – TODAY!
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more **power** → Greater Speed

greater **climb** → Less take-off distance

more **room** → Greater comfort

all in the 1958 MARK 20

Yes, the 1958 MARK 20 is the plane you have been asking for . . . a really advanced-design four-place plane that provides high performance at low cost.

NEW for '58 is the Mark 20 A with a 180 h.p. engine by Lycoming — the famous name of all aircraft engines.

NEW . . . cruise at 180 m.p.h.

NEW . . . climb 1200 feet-a-minute.

NEW . . . more room for every passenger . . . insuring perfect, relaxed comfort for all.

NEW . . . shock mounted IFR instrument panel.

NEW . . . accessory equipment hatch.

Seeing is believing and flying a Mark 20 is the clincher! YOU be the judge . . . compare and discover . . . the Mark 20 for 1958 is at your distributor now. For information write:

MOONEY AIRCRAFT inc. KERRVILLE, TEXAS

Leading airlines freely exchange ignition

Divided into six half-day sessions, the Champion-sponsored ignition conferences follow an agenda of questions submitted in advance by participants. Each session is guided by one of six chairmen, all of whom represent airlines. This year's chairmen are pictured above.

ORGANIZATIONS REPRESENTED

Aero Engine Laboratory
Allegheny Airlines
American Airlines, Inc.
American Aviation
Aviation Week
Bristol Aero Engines
Canadian Pratt & Whitney
Capital Airlines
Civil Aeronautics Authority
Co-Operative Industries
Delta Air Lines, Inc.
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SOHIO
South African Airways
Sperry Gyroscope Co.
Titeflex, Inc.
Trans Canada Airlines
Trans World Airlines
United Air Lines, Inc.
United States Army
United States Navy
Vapor Blast Manufacturing
Wright Aeronautical Division

Walter J. Krissek of Trans World Airlines was chairman of the first session, which dealt with "Spark Plug Service Experience," also served as a chairman in '56.

Delta Air Line's **Dean Miller,** serving as a conference chairman for the first time, headed the session concerning "Recondition, Test and Inspection of Spark Plugs."

George E. Roycraft of North Central Airlines, the only other first-time chairman, presided over the second meeting dealing with "Spark Plug Service Experience."

experience for improved engine performance

FOR 13TH STRAIGHT YEAR, AIRLINE ENGINEERS HOLD 3-DAY QUESTION SESSION WITH IGNITION EXPERTS AT CHAMPION-SPONSORED CONFERENCE IN TOLEDO

Because scheduled airlines constantly seek ways to make their already excellent engine performance even better, an unusual conference takes place in Toledo each year.

In this conference, business competitors openly discuss all aspects of the operation, maintenance and performance of their aircrafts' ignition systems. Without reservation, they answer all questions – freely passing along know-how and experience that may have cost hundreds of man-hours and thousands of engine-hours to acquire.

Manufacturers of engines and engine parts also take an active part in these discussions, making available all the ignition information in their possession.

The Champion Spark Plug Company, sponsor of these conferences, wishes to thank all concerned for their contributions.

CHAMPION SPARK PLUG COMPANY • TOLEDO 1, OHIO

American Airlines' **C. C. Mitchell** headed session on "Research and Development," "Ignition Analyzers," "Magnetos, Harness, Leads," was also a chairman in 1956.

A. A. Weigand from Eastern Air Lines, a chairman in 1956, conducted the discussions on "Spark Plug Fouling" and "Effects of Fuel and Lubricants on Spark Plugs."

Trans Canada Airlines was represented by **Alex Weber,** who presided over the talks on problems of "Jet Ignition," also served as chairman in 1947 and 1948.

Air intake scoop atop fuselage behind wing, double-panel glass and absence of exposed antennas mark appearance of Aero Design's new 260-mph. Alti-Cruiser, first airplane designed for business flying to be certificated with pressurized and air-conditioned cabin. Only exposed antenna is ADF sense antenna and flush loop. All others are submerged.
—(Aero Design Photo by Wayne Entriken.)

Alti-Cruiser Factory Data

Top Speed	
Rated Power at 10,000 ft., mph.	260
Cruising Speed	
70% Rated Power at 10,000 ft., mph.	230
Cruising Speed	
65% Rated Power at 15,000 ft., mph.	230
Range	
55% Rated Power at 10,000 ft., with 30-min. reserve, miles	1,500
Gross Weight, lbs.	7,000
Empty Weight, see standard equipment included, approximate lbs.	4,900
Useful Load, lbs.	2,100
Fuel Capacity, useable gals.	223
Stall Speed	
Gear and flaps down, power off, mph.	71
Gear and flaps up, power off, mph.	79
Rate of Climb	
Two Engines, sea level, fpm.	1,625
One Engine, sea level, fpm.	310
Service Ceiling	
Two Engines, feet	25,567
One Engine, feet	15,000
Take-off Distance	
To Clear 50-ft. Obstacle, ft.	1,265
Landing Distance	
Over 50-ft. Obstacle, ft.	1,450
Dimensions	
Span, ft.-ins.	44-¾
Length, ft.-ins.	35-5
Height, ft.-ins.	14-9
Tread, ft.-ins.	12-11¾
Cabin Dimensions	
Distance from forward cabin bulkhead to rear cabin bulkhead, ins.	127.5
Width, ins.	52
Height, ins.	53
Total Cu. Ft.	177
Baggage Compartment Dimensions	
Width, ins.	47
Height, ins.	41
Length, ins.	31
Cu. Ft.	32
Price, fully equipped	$183,750
Power Plants	Two 6-cylinder geared and supercharged Lycoming GSO-480-B-1A6 engines with oil-cooled pistons, each rated at 340 hp. @ 3,400 rpm. for take-off and 320 hp. @ 3,200 rpm. and equipped with Hartzell all-metal, constant-speed, full-feathering 3-blade propellers and spinners.
Pressurization and air-conditioning system	Single-stage, centrifugal Stratos compressor, driven by Sunstrand hydraulic motor. Engine-mounted dual N. Y. Air Brake Stratopower variable-delivery hydraulic pumps. Stratos BUR-20 turbine boot-strap expansion turbine for cooling cabin air. Janitrol 40,000-BTU combustion heater. Barber Coleman Micro Pulse integrated control system. AiResearch automatic cabin pressure control. Ground blower.
Cabin system specifications	Cabin differential pressure 2.0 to 2.3 lbs. per sq. in. Cabin altitude, 9,000 ft. at airplane altitude of 15,000 ft. Cabin altitude selection adjustable between minus 1,000 ft. and 10,000 ft. Cabin rate of pressure change adjustable between 0 and 2,000 fpm. System cooling capacity — dry air rated turbine discharge temperature drop of 50 degs. F. or 13,500 BTU per hour. System heating capacity — 52,000 BTU per hr. with pressurization operation; 40,000 BTU per hr. with ram air operation.

Pressurized Alti-Cruiser For Business Flying

Aero Design pioneers new realm with first pressurized and air-conditioned cabin

CABIN pressurization and air-conditioning, long-awaited basic improvements needed for wider use of business planes and more flying in them, have become a reality for the first time in the new "Alti-Cruiser" Aero Commander for 1958. The new Commander model which pioneers this significant accomplishment was introduced by Aero Design and Engineering Company last month at its annual distributor sales meeting in Oklahoma City, where the firm also dedicated its new factory at Tulakes Airport replacing its burned-out former plant.

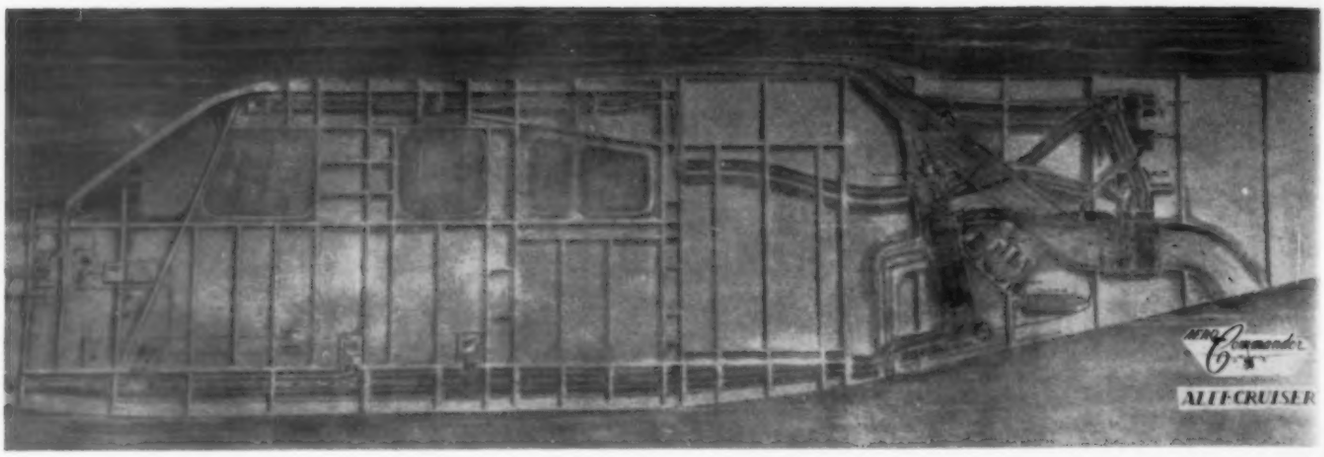
By TOM ASHLEY

The Alti-Cruiser has a sealed cabin which will maintain sea level pressure up to 5,000 ft. and a cabin altitude of only 9,000 ft. while the aircraft cruises at 15,000 ft. A differential pressure of 2.0 to 2.3 lbs. per sq. in. makes the difference of some 5,000 to 7,000 ft. between inside and outside altitude conditions.

The Alti-Cruiser's cabin compressor, or supercharger, is driven by a hydraulic motor which is powered by two pumps, one on each aircraft engine. They convert a total of 14 to 18 horsepower from the power plants into a 3,000-psi. hydraulic drive for the cabin compressor. It and other components of the pressurization system are engineered into a compact and relatively lightweight "package" located in the fuselage behind the rear baggage compartment.

Pressurization is achieved by keeping the cabin "pumped up" like an airliner with compressed air, much the same as an engine supercharger gathers in and compresses a large volume of air for combustion while flying at thin-air altitudes. This pumping of large quantities of air into the cabin

Pilot's Panel Equipment	Air speed, attitude gyro, Gyrosyn compass, rate of climb, altimeter, clock with sweep second hand, two omni indicators, localizer and glide path indicator, radio magnetic indicator, ADF indicator, cabin rate of climb, cabin altimeter, trim tab indicator, pressurization controls, radar controls, radar scope. NOTE: turn and bank and gyros electrically driven.
Co-Pilot's Panel Equipment	Air speed, turn and bank, attitude gyro, directional gyro, clock with sweep second hand, two omni indicators, localizer and glide path indicator, ADF indicator, flap position indicator, radio magnetic indicator, two volt-ammeters, vacuum warning lights. NOTE: turn and bank and gyros vacuum operated.
Engine Panel	Dual tachometer, dual manifold pressure, two engine gauge units (oil temp., oil pressure and fuel pressure), cylinder head temp. gauge (dual), hydraulic pressure gauge, vacuum gauge, two fuel quantity gauges, carburetor air temp. (dual), supercharger bearing temp. indicator (dual), landing gear control and lights, throttle quadrant, throttles, prop controls, idle cut-off controls, carburetor air controls, dual friction locks, flap control and ADF control head. NOTE: Outside air temp. gauge and magnetic compass mounted above center engine panel.
Radio Equipment	Standard equipment includes choice of Collins, Bendix or Wilcox installed package, with edge-lighted control panel featuring "piano-key" switches. Radio units mounted in integrally-wired rack for quick-change accessibility. Each of three packages includes complete multiple receiving, transmitting and navigation components of airline TSO standards. Completeness is indicated by Wilcox Canari system package which includes one 700 20-channel ILS-glideslope receiver, one 701 ADF, one 702 marker beacon receiver, 1 705 560-channel communications receiver, two 706 navigation receivers, two 707 360-channel communications transmitters, one 709 audio mixer amplifier, 1 standby audio amplifier, 3 speakers (pilot, co-pilot and cabin). All antennas internally submerged except ADF sense antenna.
Seating	Two choices standard, one with six seats, the other with four seats and lavatory compartment.
Standard Equipment	Special-interest items among many standard equipment items include lifetime nickel-cadmium battery, dual 75-amp. generators, 22-cu.-ft. individual outlet emergency oxygen system, Skydrol Safety fluid hydraulic system, hydraulic windshield wiper on pilot's side, contoured posture chairs with fold-back arm rests on both sides of individual chairs and folding center arm rest for rear seat back, lavatory compartment with wash basin standard in 4-place version, folding table for work or card playing, bulkhead-mounted thermos in 4-place version, individual ash receivers and lighters at each seat, individual combination reading lights and cabin ventilators, rotating beacon.
Optional Equipment	Only four optional items are listed as being of major interest, any others being considered unnecessary. The four are Lear L-2 autopilot with accessories; RCA AVQ-50 radar; de-icer boots for wing and empennage, and alcohol propeller de-icing system.



This cross-section sketch of the Alti-Cruiser's fuselage shows location behind the baggage compartment of its compact pressurization - air conditioning package. Most of the air from intake scoop at top passes through heat exchanger near bottom of package and is exhausted out bottom. Atop heat exchanger (square object in large duct) are cabin compressor (top) and boot-strap expansion-turbine. Units near bulkhead are heater and ground blower. Entire pressurization installation, including cabin strengthening, weighs less than 300 lbs. installed

eliminates the Alti-Cruiser's need for bottled oxygen for occupants while cruising at levels in the neighborhood of 15,000 ft., where optimum aircraft performance is obtained. Without pressurization, bottled oxygen is generally used while flying at levels from 10,000 ft. upward. But with the cabin air maintained at less than 10,000 ft. while the aircraft is higher, occupants need not resort to bottled oxygen until flight levels above 15,000 ft. are reached. The Alti-Cruiser's service ceiling is above 25,000 ft. Its single-engine service ceiling is 15,000 ft.

Compressed air from the Alti-Cruiser's cabin supercharger not only maintains desired cabin pressures and oxygen content but also drives a unique little turbine which furnishes refrigerated air-conditioning. This is known as a "boot-strap" unit, from the phrase of "lifting one's self by one's boot-straps," because the Alti-Cruiser's air-conditioning is accomplished at no expense in power whatever. The boot-strap turbine is powered by the compressed air. The little turbine rapidly expands the air, causing a phenomenal drop of 50 degrees in the temperature of the air and creating refrigeration. This degree of cooling is the equivalent of 13,500 BTU per hour. Refrigerated air-conditioning is accomplished even on the ground with the aircraft parked and its engines idling. Thus the Alti-Cruiser is not only the world's first certificated pressurized non-airline business plane but is also the first plane designed for business flying with refrigerated air-conditioning.

Until the Alti-Cruiser became available last month, with deliveries beginning in May or June of this year, only large airliners costing $500,000 and more offered cabin pressurization and air-conditioning to business fliers. These basic improvements are unavailable in many business transports costing up to $400,000 and more. The pressurized Alti-Cruiser is now available at a price of $183,750, thus bringing cabin pressurization and air-conditioning to business flying at only one-third the cost of the lowest-priced pressurized airliners available to business firms, these being surplus Convairs currently and soon to be released.

Complete equipment, including instrumentation and radio, much of it dual, is standard in the Alti-Cruiser's price. This includes a modern lightweight airline-quality radio navigation and communications package worth $45,000 to $50,000, with the buyer having a choice among top-quality Collins, Bendix or Wilcox packages. Among the reasons why complete equipment is included as standard is the avoidance of complexities involved with installations after aircraft delivery. It is difficult to make such post-delivery installations by chopping into a sealed cabin. Therefore the Alti-Cruiser is manufactured with all of its equipment going in as part of the complete process. Standardization in equipment packages will develop from this, in which the Alti-Cruiser can definitely provide another significant accomplishment in business aircraft progress.

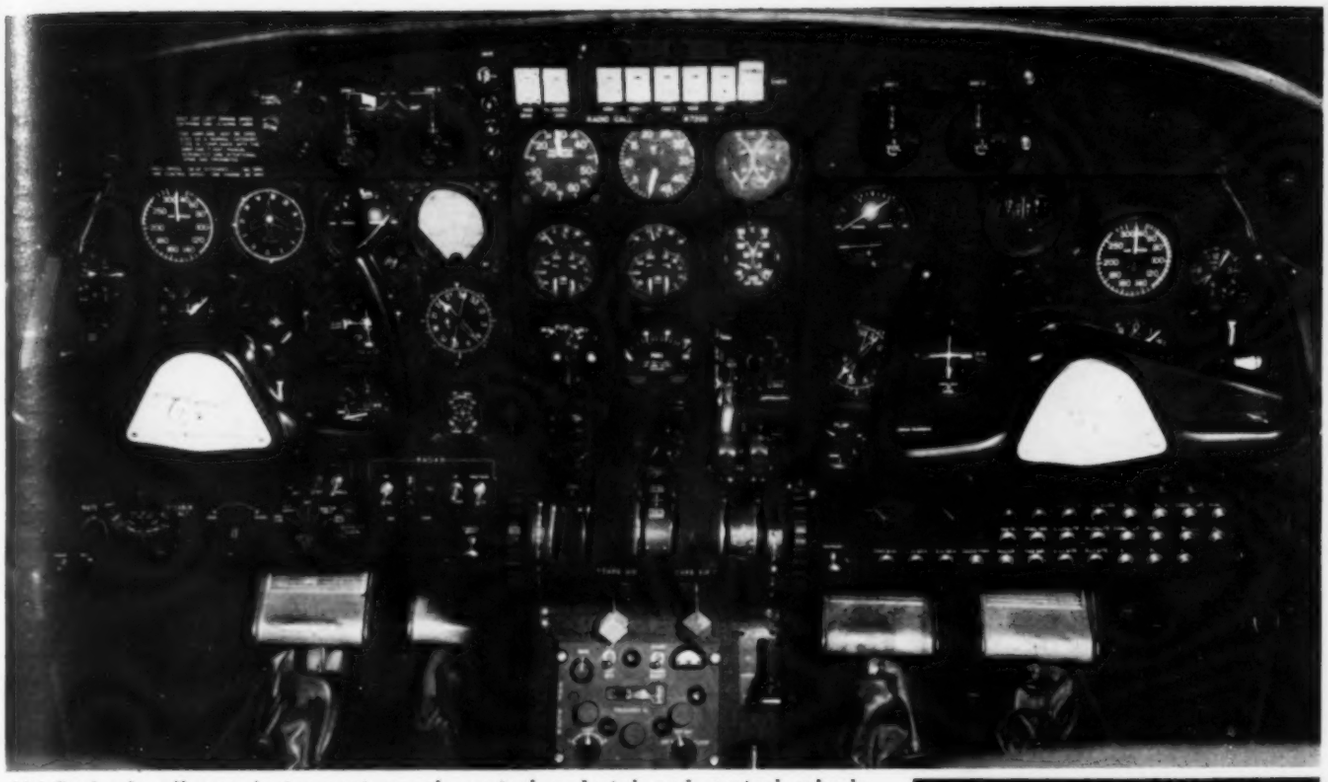
The Alti-Cruiser is basically a 680 Aero Commander with pressurization. It has the same supercharged 340-hp. Lycoming engines, of the latest perfected model, the same 7,000-lb. gross weight and therefore the same outstanding performance, flight and design characteristics of the 680 Commander, which was the first modern American business twin to offer engine supercharging for efficient performance at altitude in business flying. Distinguishing the Alti-Cruiser and the 680 are their 260-mph. top speed, 230-mph. cruising speed, 15,000-ft. single-engine service ceiling, 223-gal. fuel supply for 1,550-mile range with reserve, 1,625-fpm. rate of climb, 71-mph. stall speed and short-field capabilities with 1,265-ft. take-off and 1,450-ft. landing over 50-ft. obstacles.

Equally distinctive is the transport cabin configuration of the high-winged Alti-Cruiser and 680 Commander, for it provides ease of cabin entry with the cabin floor only 18 inches off the ground. Occupants step into the knee-high cabin as easily as entering an auto. The transport-type cabin layout provides individual seating with an aisle, by which the pilot can be the last occupant to enter or leave while attending to the needs of both the passengers and the aircraft.

Pressurization and air-conditioning have greatly enhanced this unique cabin's advantages among business aircraft types. Although pressurization is the latest of numerous improvements to the basic Commander design, it is definitely not an after-thought and it did not require a major redesign of the cabin or the aircraft structure. The truth is that the Commander was originally designed for pressurization, according to Ted R. Smith, its designer and vice president-research and development of Aero Design.

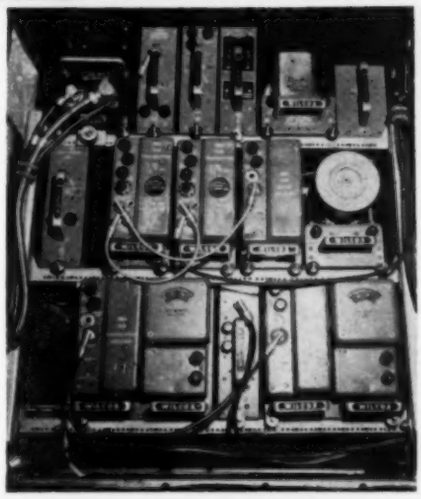
"If the design had not originally provided for adaptation to pressurization as a follow-on development, we would not have an Alti-Cruiser now because pressurization would not have been otherwise practical or economical from a cost standpoint," Ted told us.

Proof of this is found in the fact that pressurization has added only



Alti-Cruiser's all-new instrument panel, control pedestal and control wheels indicate the airplane's completeness. Radio panel at top features new "piano-key" switches. Pilot's panel with electric gyros has cabin altimeter, pressurization controls, radar controls and scope. Co-pilot's panel has vacuum gyros. Note complete dualization for both panels. Engine panel at center has new supercharger bearing temperature indicator. New pedestal has ADF controls. Standard equipment includes Collins, Bendix or Wilcox airline radio package. Wilcox package is pictured at right with integrally-wired rack in baggage compartment for simple plug-in accessibility of units.

—(Aero Design Photos by Wayne Entriken.)



about 300 lbs. in weight to the 680 Commander's empty weight. This includes all the pressurization, air-conditioning, ground-blower, temperature-control and hydraulic-system machinery and elaborate ducting as well as cabin structure beefing, sealing and heavier windshield and windows.

New $6,000,000 *factory at Oklahoma City's Tulakes Airport was formally dedicated at Aero Design's annual sales meeting and is seen below from the production line. Old factory was destroyed by fire last fall.*

—(Aero Design Photo by Wayne Entriken.)

This Alti-Cruiser interior has four track-mounted, reclining back contour seats with arm rests and a complete lavatory behind the rear bulkhead which angles across from the doorway. Thermos containers are in bulkhead near door. Six-seat version is available without the lavatory compartment.
—(Aero Design Sketch.)

CAA certification of Alti-Cruiser brought these smiles to officials in ceremony. Left to right are Salty Junker of CAA; George Pew, Aero Design president; Ted R. Smith, vice president-research and development, and Bob White, vice president-marketing. Picture below shows hydraulic windshield wiper on Alti-Cruiser, which was inspected by distributors at annual sales meeting.
—(Aero Design and FLIGHT MAGAZINE Photos.)

Further confirmation of the original design's provision for pressurization is found in the fact that no inner, or secondary, cabin shell was necessary. Numerous experiments to pressurize aircraft not designed for pressurization have proved impractical from weight and cost standpoints. Another fact which makes the Alti-Cruiser's pressurization a classic accomplishment is that its cabin is of rectangular configuration, whereas pressurized airliner cabins are of circular or double-bubble figure-8 cross-section. A circular cabin distributes the pressure evenly to minimize the problems involved — but it imposes a prohibitive restriction for passenger space when scaled down to the dimensions of an economical small twin in the category of the Alti-Cruiser. The Alti-Cruiser's spacious cabin interior would be impossible to achieve with a circular cross-section unless the entire aircraft and its power plants were scaled up considerably in size. For weight and power, the Alti-Cruiser therefore had to have a non-circular cabin.

The windshield is laminated glass of 5/16ths-in. thickness instead of the 3/8ths-in. Plexiglas in the 680 Commander. It has a separate sheet on the interior, providing an air space for the entire surface in which heated air is ducted for windshield defrosting. The Commander's storm window on the pilot's side was eliminated when the cabin was pressurized. The Alti-Cruiser is equipped with a hydraulically-operated windshield wiper as standard.

Windows are double-panel, hermetically-sealed units, one panel being of 3/16ths-in. thickness and the other of 1/8th-in. thickness. Instead of being clamped in, as on unpressurized aircraft, all glass is bolted to the airframe and is a part of the structure itself. For bolting, the glass is drilled and rubber bushings are used. The cabin door has 7 fastening or locking points as compared to three on the unpressurized 680 door. Two are the hinges and 5 are locking-bolts actuated by the door handle, one being at

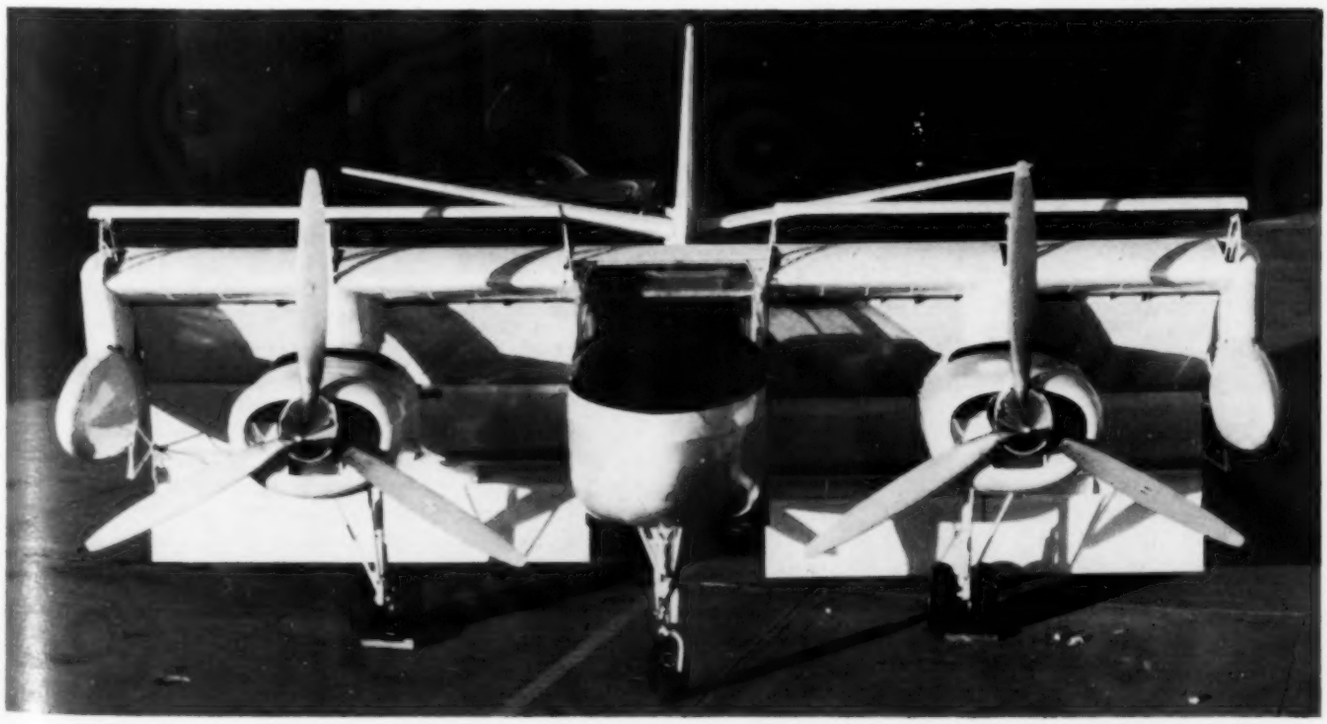
(Continued on page 62)

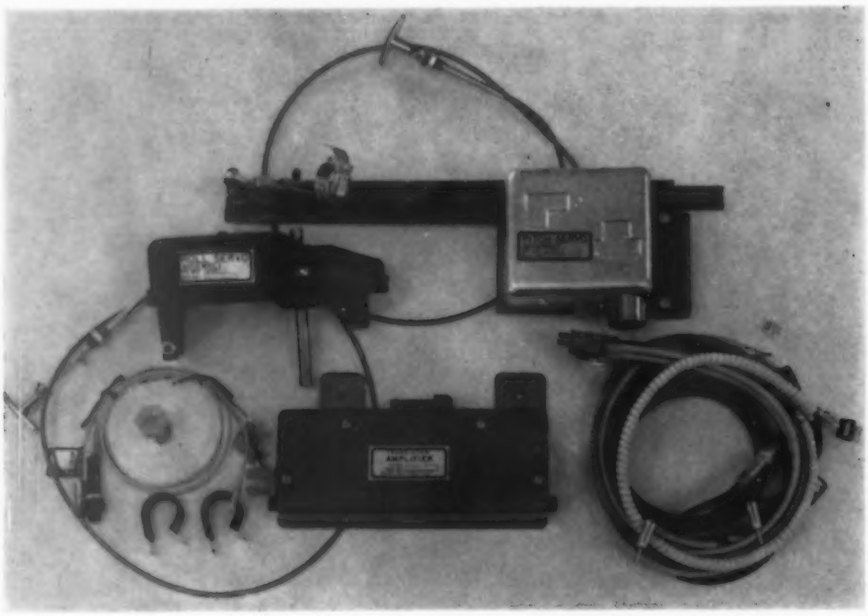
Pod-mounted engines on Aero Design VTOL are 340-hp. Lycomings whose thrust in pounds exceeds the gross weight.

Aero Design's 4-Place VTOL

FROM zero landing and take-off speed to well over 300 mph. for cruising — that's the intended speed range of a twin-engine 4-place VTOL (vertical take-off and landing) lightplane being perfected for Aero Design & Engineering Co. of Bethany, Oklahoma, by its wholly-owned subsidiary, Robertson Aircraft of Ft. Worth, Texas. Powered by two supercharged Lycoming GSO-480's with a total of 680 horsepower, the little twin uses immense flaps for vectoring the propeller slipstream downward on take-off or landing at zero speed. This eliminates the need for airports or runways. The big flaps are retracted into a stub wing for level flight. The VTOL, which bears some resemblance to the Aero Commander in its horizontal stabilizer and engine nacelles, was designed by Jim Robertson, a brilliant young engineer who has already demonstrated it to the Army in its first tethered flight. It is a private venture.

Large flaps direct slipstream downward and large leading-edge shroud provides effective equilibrium at hovering and slow speeds. Stub wing's end plates fence slipstream, contain flap attach structure and carry fuel.





Here are all of the units and parts of the transistorized Mitchell autopilot. Units from bottom up are amplifier, roll servo and pitch servo. Gyros with Mitchell pick-offs are shown below, directional gyro having knob for turn trim and attitude gyro having knob for pitch trim.

Mitchell Autopilot Data

Total weight of the AKO58 transistorized autopilot is 8.2 lbs., as made up by the following components: Roll servo, 2.4 lbs.; pitch servo, 3 lbs.; transistor amplifier, 2 lbs. and cable assembly .8 lb. Both servos are yoke mounted. This weight does not include the two gyros. Twelve-volt current consumption is one-tenth amp. in quiescent condition and 1 amp. for hard-over control. Autopilot uses no relays, no tubes, no dynamotor, no vibrator and is covered by one-year unconditional guarantee, excluding gyros.

Mr. Mitchell Hits The Jackpot

Eight-pound electronic all-transistorized autopilot for lightplanes

By GEORGE E. HADDAWAY

AFTER three years of exhaustive engineering and flight testing under all conditions, the Mitchell 3-control, 2-axis autopilot is on the market in a completely transistorized package weighing only 8.2 pounds.

Simplicity and dependability are the outstanding qualities of the 1958 model, now approved for all model Bonanzas, the 172, 180 and 182 Cessnas, the Piper Apache, Comanche and Tri-Pacer and both single and twin-engine Navion. The first transistorized model was delivered last December and over 50 were delivered to owners during the early weeks of January. Production has been stepped up to one a day with backorders now forcing additional production expansion.

Under average operating conditions the unit pulls only 1/10th of an ampere off the 12-volt line. In normal rough air this increases to ½ to ¾ amps and under very rough air conditions it never draws more than 1 amp. A transcontinental flight is being planned on which hearing aid batteries will power the autopilot to demonstrate the low current consumption required. This low current drain characteristic is due to the fact that the roll servo and the pitch servo are so efficient they do not run continuously.

Since all the components are mounted between the firewall and the instrument panel, installation cost and time are at a minimum.

A mechanic can make the complete installation with no soldering or complicated wiring necessary. Nor is it necessary to rip into unholstery, run plumbing or install components into the cabin or fuselage. The 8.2-lb. weight is for the two servos, the transistorized amplifier, controls, wiring, fittings, plugs and everything except the weight of the two gyros, usually already on the airplane.

Mounted behind the panel and practically on the center of gravity, the Mitchell Autopilot makes for easy access and quick removal in case an owner trades off his airplane and wants to keep his equipment. It is the most compact autopilot on the market.

The Mitchell lists at $2,425, including the gyro horizon and directional gyro. If the owner furnishes his own gyros the price is $2,325. Installation is extra. National distribution has been established with General Aviation Supply Company operating from St. Louis, Oklahoma City, Houston, Dallas and Phoenix; the Don Horn Company of Memphis; Aviation Supply Corporation of Tampa and Orlando; and General Aircraft Supply of Detroit. These concerns will handle national distribution and will set up dealerships, primarily with aircraft retailers who will equip at least one demonstrator with the unit.

The main key to the complete dependability of the Mitchell and the reason Mitchell gives an unqualified year's guarantee of the equipment is the replacement of vacuum tubes with transistors. The factory maintains a transistor quality control that includes baking the entire amplifier to 150 degrees Fahrenheit in an oven. When cooled, each unit is tested on a mock-up of the type aircraft it is designed for, complete with harness and all fittings, where it is accurately calibrated and ready for service use. Also, any malfunctioning of a transistor will show up in the first few hours of use. If none develops in the first week or two it is good indefinitely. Gyros are guaranteed for 90 days.

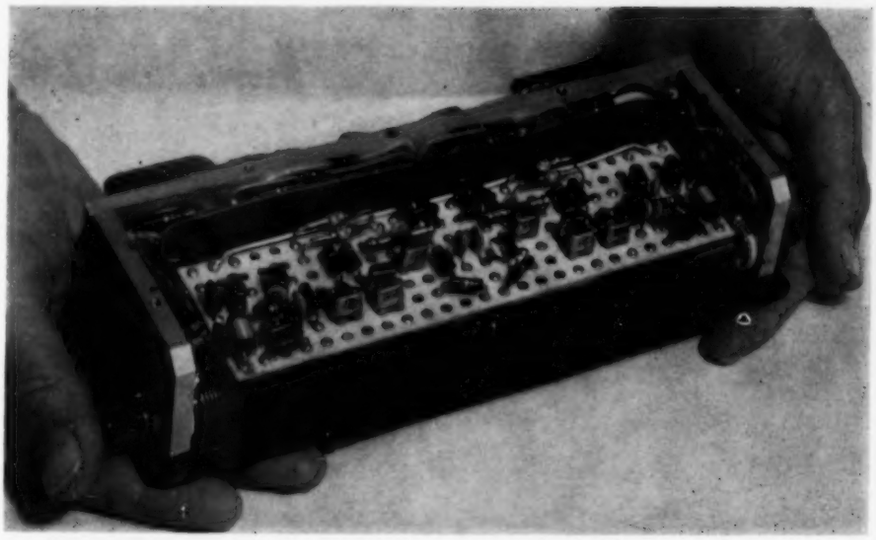
We spent two hours in General Aviation Supply Company's Cessna 180 last month testing the autopilot on a cross-country flight. On take-off we got up to about 500 feet altitude before turning on the autopilot master switch, since CAA approval requires three-second recovery time in case of malfunctioning. We then engaged the roll servo and established the climb-out compass course, rotating the direction gyro to 0 degrees. On course, we engaged the DG servo and manually turned the vernier trim knob on the DG until it held the zero heading steadily, feet off, as riding the rudder will throw the DG off. In the climb we found that the trim knob must be rotated to the right to compensate for torque. The large pitch knob is turned to hold the desired angle of climb established manually.

Upon reaching desired cruise altitude, we disengaged the manual control of pitch and adjusted the trim tab and leveled out, set manifold pressure and prop pitch for altitude. Reaching level flight, we engaged the pitch servo. The pitch knob was turned to approximate level flight so that we were neither climbing or diving. Then we placed the pitch trim knob in full downward position to produce about a 200-foot descent. When full forward speed was obtained, we simply used the trim knob to stop the descent, trimming the ship to level flight on the step with maximum cruising speed. About ten minutes later we checked pitch trim by disengaging manual pitch control to determine if the nose remained in the same position.

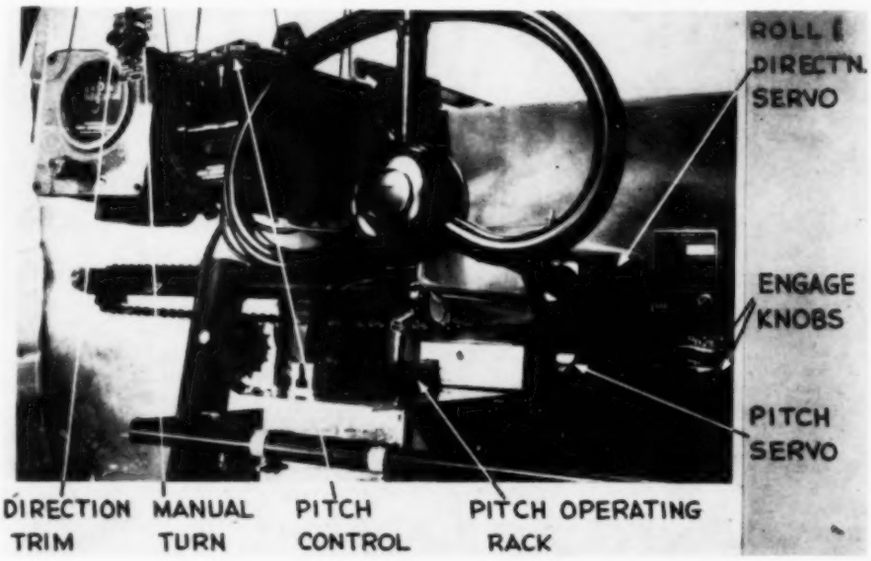
All this is easier done than said. It is actually a very simple procedure and one short flight is usually all one needs to become completely familiar with climb out, trim out at cruise, turns and descent. You can check drift and make correction very easily by a rule of thumb computation which, at fifty-five miles out from the last check point, you correct one degree for every mile off course. If, at 55 or 60 miles out you're ten miles off course, just cage the DG and make a 10-degree drift correction, uncage the DG and you're back to the correct crab angle to compensate for drift.

While the autopilot primarily serves the function of relieving the pilot of manually flying the airplane, providing time for handling ever-increasing amounts of radio and paper work and for fatigue prevention, it offers far more versatility than these aids suggest. It keeps a heading better than the pilot. It holds altitude better than the pilot can. It flies the airways or any

(Continued on page 40)



Small, compact transistorized Mitchell autopilot amplifier (above) weighs only 2 lbs. and all circuits are stitch-wired on glass fibre board with no printed circuits or paper condensers used. All transistor sockets are soldered and complete assembly is treated with anti-fungus spray. Mock-up of autopilot installation below shows how all components are on or near the instrument panel, with both servos yoke-mounted. Each autopilot is pre-tested on mock-up installation for each type of airplane, making possible easy installation in the field.



Parking lots at Fort Worth's Western Hills Inn were used by Bell and Republic Alouette helicopters last month during the Helicopter Association of America convention. New HAA President Dick Eccles (left) of Stockton, Calif., is shown with Carl Brady of Yakima, Washington, last year's president.

—(Bell Photos.)

10 Years Of Copter Success

Optimistic outlook for Helicopter Association's commercial operators

ONLY ten years old as an industry, the business of operating commercial helicopters has evolved through its barnstorming stages to emerge as a sound enterprise with an enviable record of profitable expansion and a future promising steady growth based on the helicopter's constantly-improving mechanical integrity as a dependable industrial machine.

This was the impression given by the operators themselves in proceedings of the 10th annual Helicopter Association of America convention last month in Fort Worth. HAA's principal accomplishments have been the yearly gatherings of its members, who are commercial helicopter operators, with manufacturers and suppliers of the helicopter industry for joint discussions of industry problems and developments. This year's get-together was the best, most optimistic and largest yet.

Consider, for example, the report by Carl Brady of Economy Helicopters of Yakima, Washington, winding up his term as HAA president: "The operators are in very good shape as a whole this year — better than they've ever been. Most of us had a fairly profitable year and some healthy things have been happening in our business. Where contract work once was predominantly for government agencies, the percentage scales have now tipped in favor of private industry."

Or take the word of HAA's new president for the coming year, Dick Eccles of Stockton Helicopters, Stockton, California: "We're at the beginning of a tremendous growth period for commercial helicopter operations." Then there's Lee Plympton of Helicopters International, who has been a commercial copter operator longer than anybody and operates fourteen Bells. "There'll be continued steady growth in established fields," he says.

Carl Agar, the Canadian who has made his firm's name, Okanagan Helicopters, a symbol of success in the wilderness, reports a satisfactory year for his 44 helicopters, world's largest commercial fleet. Steady growth of business is expected by Bob Suggs of Petroleum Helicopters, which keeps 40 helicopters busy, mostly in the Gulf of Mexico off-shore oil activity.

Knute Flint, whose operations were launched ten years ago with $30,000 and now have a net worth of forty times that amount, or $1,300,000, said the industry has great horizons overseas as well as at home. Flint, only 37, heads World-Wide Helicopters, which operates around the world, deals in seven different national currencies and numbers among its employes 11 different nationalities. Flint has three Sikorsky S-58's in Australian New Guinea oil exploration, four Bells in Dutch New Guinea, two Sikorsky S-55's and two Bells in Borneo off-shore work, three Bells in East Pakistan, two Catalina boats doing oil exploration 180-miles off-shore in the Bay of Bengal, four helicopters in Libya and other helicopters in India-Burma, and Venezuela. World-Wide began in California in 1947 as A-F Helicopters (for Armstrong-Flint) and is now wholly overseas in its operations.

For a look at expanding commercial helicopter operations in South America, we interviewed Sil De Yoreo, Bell Helicopter Corp. service representative for South America, stationed at Caracas, Venezuela. There are now more than 100 Bells operating in South America and the number is increasing every month. Two principal operators in Venezuela are Aerotecnica and Helivenca, both operating chiefly in off-shore petroleum work. Aerotecnica, headed by Capt. Manuel Mendoza and Antonio Dugarte, added 5 Bell 47G's and 3 Bell 47J's last year, bringing its fleet to 11 G's and 3 J's. It averaged about 800 hrs. of flying monthly in oil work. Helivenca, headed by Dr. Mauricio Dager, operates four 47G's and 1 47J, adding 2 G's and the J during the year. It averages about 300 hrs. a month for flying logged in off-shore work, with distances up to about 35 miles. Off-shore drilling is

increasing steadily there. A new development is the organization of a large servicing company, Terminales Maracaibo, which will specialize in providing complete off-shore well servicing. It includes helicopter operations in its plans. Another Venezuelan company is Helicargo of Caracas, now using four Bell 47G-2's and planning more machines in its specialized services for construction companies. These four Bells are each averaging more than 100 hrs. of operations a month through the year, utilization being on the order of 6 hrs. daily. At Barranquilla, Helicol operates a fleet which varies from five to ten Bells in oil company exploration.

New helicopter operations are being developed steadily elsewhere in South America. In Ecuador, a banana spraying experiment by New England Helicopters, with up to 7 Bells being used, has proved so successful that it is expected to expand significantly. Three Bells and a Hiller are used in a Brazilian experiment with coffee plantation spraying. A large new off-shore oil drilling activity is expected to develop in the Gulf of Paria, which some experts believe will become another Lake Maracaibo in its volume of oil production. Spectacular helicopter rescue work has been accomplished by the military in Uruguay, where public subscription is now starting for a helicopter air taxi service. Heliports are being built for it.

"The future for commercial helicopters has never looked brighter in South America," De Yoreo told us.

U. S. domestic operations present the same bright outlook to operators who know the limitations as well as the potential of the business. One such is Hal Conners, whose successful development of the Helicopter Air Lift air taxi service inside the city of Chicago was originally outlined in FLIGHT MAGAZINE last fall and has since become the symbol for modern helicopter usefulness in large cities.

Manufacturers attending the meeting were just as confident of continuing expansion of commercial helicopter operations. Harvey Gaylord, president of Bell, reported his commercial volume is increasing at a rate of about 30% per year. His new commercial sales manager, Fred Roscoe, outlined progress in expansion and intensification of the factory's sales efforts.

Vertol reported on its intensive marketing plans for large Vertol Model 44 rotor transports; Cessna said it will decide within several months whether to introduce its commercial 4-place this year, and Hiller said it expects a significant upturn in volume with deliveries later this year of its new 3-place, which will have a more powerful Lycoming engine and greatly-extended overhaul life for the entire helicopter. Sikorsky reported good demand for its current production models, the S-55 and S-58, and said its new S-62 which incorporates S-55 components but will be powered by either Lycoming T-53 or General Electric T-58, will be available as soon as CAA certificates the turbines, maybe in 1959. Sikorsky is also developing a new twin-turbine transport "of considerable seating capacity" for the scheduled airline operators. Its S-58 has been given a new 13,000-lb. gross weight, up from 12,700 lbs., and all of the increase is added payload. Aerodynamic refinements and a more efficient cooling fan, requiring 35 to 50 hp. less than formerly, made the increase possible.

Vertol said the first customer for its commercial Model 44 is the Swedish Navy, which ordered four with amphibious hull. Vertol is selling the 44

(Continued on page 59)

Commercial copter operators of the Helicopter Association of America all represent success stories but one of the most unusual careers is that of 37-year-old Knute Flint, above. His $1,300,000 operation mushroomed from a $30,000 start in 1947.

Part of the attendance at the Helicopter Association of America's 10th convention is shown above. New officers of the commercial operators' organization are pictured below. Left to right are Richard D. Eccles, Stockton Helicopters, Stockton, Calif., president; Ralph W. Beathe, manager of Dean Johnson, Inc., McMinnville, Oregon, secretary, and Robert E. Trimble, manager of Aetna Helicopters of Etna, Calif., treasurer.

Alouette Makes Its Bid

THE nice thing about a helicopter convention is that you can have helicopters operating from the front door of convention headquarters provided you pick the right hotel. The Helicopter Association of America managed to pick the right place last month for its 10th annual meeting by choosing the new Western Hills Inn between Fort Worth and Dallas. The French-built, Republic-sponsored Alouette was there, making a strong bid to the operators for a piece of the growing U. S. commercial helicopter market.

Immediately following the convention we jumped aboard the Alouette for a cross-country to Hugh Drane's Arcadia Farms near Corsicana, Texas, some sixty-five miles south of Dallas. Just fifty-five seconds after Republic Aviation's pilot Tom Mason hit the starter button we were off the ground and on the way — no warmup necessary for the 400-hp. Turbomeca Artouste IIB1 single-shaft turbine. With Bud Kelly, also of Republic, there were three of us in the roomy 4 to 5-place cabin. With 157 gallons of JP fuel aboard, we had sufficient range to make the flight down and back and show Hugh Drane his beautiful property from a few hundred feet while demonstrating the machine. A north wind gave us thirty-three minutes down, with about forty-three minutes for the return trip. Normal cruising endurance is 3¼ hours.

The Turbomeca engine provides 360 hp. for continuous operation. Lack of vibration and the low noise level under the bubble canopy are impressive. Constant rotor rpm. with the turbine engine eliminates the throttle, which in turn eliminates the conventional throttle co-ordination on the stick and simplifies piloting the craft. Alouette flies more like a conventional airplane than any other helicopter — if helicopter pilots will permit such a comparison.

Tom Mason let both Hugh Drane and this reporter take over the controls in cruising flight. They are supersensitive — tail rotor pitch adjustment and cyclic control stick require only minute movement to start things happening. The plain collective pitch lever with no twist-grip throttle should make the Alouette easier to fly than conventional machines.

Also impressive is the load carrying capabilities of the copter. It grosses out at 3,300 pounds with an empty weight of 1,874 pounds for a 1,426-lb. useful load. It can carry 1,140 pounds of pay cargo 100 miles. Other attributes worth noting are the large fuel capacity of 157 gallons, the large allowable center of gravity range, repeated battery starting capabilities and a maximum power warning light. The fixed-shaft turbine installation is very refined and military tests reveal the machine exhibits rpm. control power response and power recovery capabilities superior to the free shaft turbines tested so far by ARDC.

Bud Kelly glowingly reported that the new engine for the U. S. certificated model (solid-piece combustion chamber) will be good for 500 hours between overhauls. Currently the engine on the experimental model is good for 250 hours and the closest competition is 120 hours. The rotors are good for 1,200 hours before overhaul.

Retail price is below $90,000, with immediate deliveries. The Turbomeca engine will deliver in the U. S. for $16,000, including duty.—G.E.H.

Republic helicopter Pilots Tom Mason (left) and Bud Kelly point out to Mr. and Mrs. Hugh Drane the unique tail rotor shafting arrangement on the Alouette II, which received CAA certification last month. Photo above shows Alouette hopping operators at Helicopter Association of America meeting in Fort Worth last month. Republic Aviation has been licensed to manufacture and sell the machine by Sud Aviation of France.

—(FLIGHT MAGAZINE Photos.)

Southwest Airmotive's new private terminal and its huge ramp-side picture window as seen from the nose of a Texaco Convair while its passengers dine in the terminal's club-like restaurant, which features fine foods as well as counter lunches.
—(Southwest Airmotive Photo by Tom W. Collins.)

Tops In Terminals For Business Flying

A PLUSH new terminal featuring complete 24-hour service and impressive architectural styling has been opened for operations on Dallas Love Field by Southwest Airmotive and is expected to set the standard for other private terminals which will be needed all over the country to service the growing needs of business flying. It surpasses many airline terminals in its size and modern facilities.

World's largest and most elaborate terminal for private fliers, the new Southwest building provides a glittering front for the firm's new 800-ft.-long, 12-acre hangar and shop line. It's curved picture-window wall is two stories high with an upswept roof facing the runways. Inside the window are a beautiful ground-floor lobby and lounge and a second-floor club-like dining room and restaurant, with an impressive free-hanging stair connecting the two.

Ground-level facilities off the lobby-lounge include a VIP visitors office and lounge; flight operations office with wall map, map table, sliding-door lockers and direct-line Weather Bureau telephones; ramp-crew office and headquarters room with lockers and showers; rent car concession; and Southwest's executive offices. The terminal monitors Unicom radio 24 hours a day for calls from incoming pilots for cabs, rent cars, ramp service, restaurant service or messages for offices and families. Restaurant hours presently are from "early morning to late evening."

The new Southwest Airmotive terminal is completely air-conditioned.

Visitors in the new Southwest terminal have a panoramic view of the nation's most active business flying service ramp. The dining room's huge picture window is 17 ft. high, and overlooks Love Field's runways. Costing $225,000, the terminal building is part of Southwest's new $4,000,000 base, largest of its kind in the world. Helicopter shown is a corporate Sikorsky operated by Chance Vought Aircraft.
—(Southwest Airmotive Photo by Tom W. Collins.)

OVER

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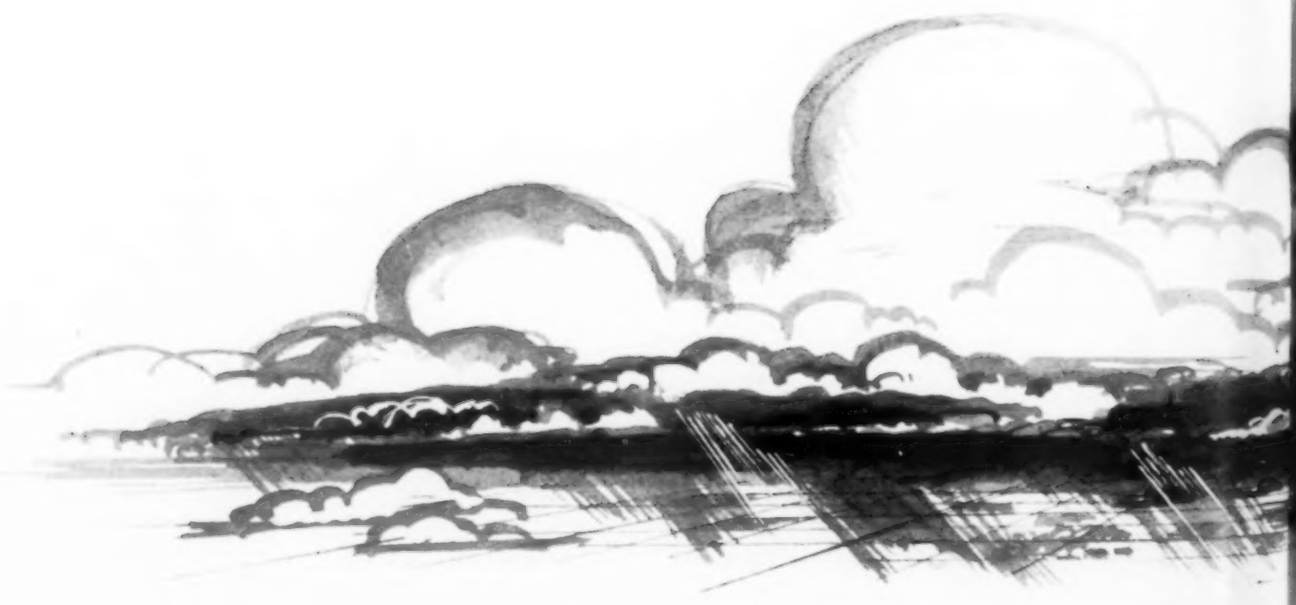

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Boats and Wheels

Here's an interesting discussion of amphibian handling and techniques

By JOHNNIE K. HAMP

EDITOR'S NOTE: The author is an engineering test pilot who operates Aviation Sales & Engineering Co., Municipal Airport, Houston. He specializes in charter and leasing of executive aircraft including considerable amphibious operations, on which he is an authority.

I BELIEVE amphibian aircraft are wonderful and I marvel that the amphibian today is taking its place in American commercial flying as a real, modern workhorse. The amphibian can utilize both land and water, reaching many areas not otherwise accessible. Most objections to amphibians in years past had to do with load limits and performance. But these have been overcome by modifications to older types and by modern design in new-production amphibians. What is needed now is a better understanding among average land pilots of the technique needed for amphibian operations, as well as an expression of gratitude to the many water pilots who have done a wonderful job of bringing the amphibian to the front in its dual-purpose role.

Maybe we can help interest a better understanding by discussing amphibian techniques. We will look over the field of multi-engine amphibians and have a few hops. We won't become too involved in multi-engine procedures because we will assume most readers will appreciate the important need for adequate multi-engine proficiency. Our hops will have to be in a Grumman G44, G44A, G21, G21A or Mallard, or in a Consolidated PBY, PBY-5A, PBY-6A, Army OA-10, 285ACF, 28-4 or a Trecker Gull, the only current-production multi-engine amphibian. We'll hop Grumman first, because more commercial pilots have flown it than any other make. Then we'll consider the new Gull. It is the only pusher — all the other multi-engine amphibs are tractors.

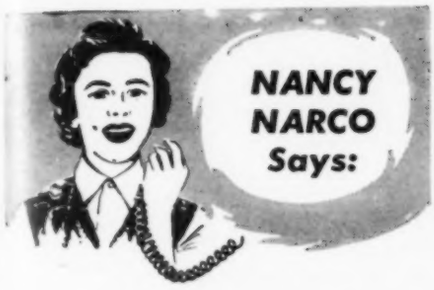
Before getting into the water, we run a thorough visual preflight inspection, with emphasis on components and details concerned with water flying. Here we learn that high wings are used to keep the props out of the water and narrow landing gear is used because it has to retract into the hull. These things mean we should use low speeds for all ground operations, especially in making ground turns, to keep from putting the outside float on the ground.

We use a runway on land for our first take-off and we take pains to note the feel at speeds when the controls become effective. This is important because in water operations, we have to lag or lead with control due to acceleration, step travel, load, wind and water conditions, engine torque and other matters. We become especially mindful of the stall speed because in many cases on water we will want control before stall speed is reached and sometimes we want sailing control without engine power.

In straight and level flight after climbing from the take-off, we make level and climbing turns and note control pressures and reaction. By reaction, we refer to the dampening effect of controls. For example, after trimming for straight and level flight, we note the indicated air speed after it has stabilized and then exert a forward control pressure until the vertical speed indicator reads 500-fpm. descent, then releasing the forward pressure and noting the airplane's reactions. We want to see what the air speed increases to (within placard speeds) before the nose oscillates to the climb position and we want to see what the air speed decreases to in the nose-up position. We also count the oscillations required before the airplane comes back to level flight.

Now we're learning about the airplane in flight. We familiarize ourselves with the elevator feel in power-on and power-off, semi and full stalls in all conditions, gear up and flaps down, gear down only and both up. We familiarize ourselves with the aircraft's single-engine ability and our own ability — in regard to foot pressure with air speed and power combinations. I am personally limited to the amount of single-engine yaw I can hold with rudder as compared to the power and speed combination — I can hold directional control down to 85 mph. with 34 ins. and 2,200 rpm. on a Grumman G21A with R985 P & W's or down to 90 mph. in a PBY-5A with 40 ins. and 2,400 rpm. with R-1830-92A's.

In our single-engine familiarization we also approach the stall at maximum continuous power and find out what our maximum power and minimum air speed is — on our next take-off, we can time our acceleration to the speed at which we can hold the airplane on one engine and we immediately know our own V-2 speeds. I have found these to vary between pilots. I have also found it is good practice to maintain directional control with rudder



KEEP THAT HEAD SET HANDY

These nice quiet airplanes we fly around in these days with their cabin speakers kind of make a person forget about having a head set handy. There are times when you can get out of touch "real good" with everyone if you rely only on the cabin speaker. For instance:

Static. Let's face it — you can get hash in your radio, even on VHF. Precipitation, defective engine shielding, or what have you, can make signals coming out of the cabin speaker pretty difficult to use.

LF Reception. This is particularly true if you have to use LF ranges. Get a little snow static or electrical storm interference, and you're just about out of business unless you have the earphones on.

Loop Null. If you have a handy homing loop tied in with your Narco LFR you really need a head set to get a good, precise null.

Weak or Distant Signals. At extreme range from an Omni station or tower you'll find you can read them fine with a head set, while they might be way down in the cabin noise on the speaker.

Audio Failure. And there is, of course, the remote chance that your speaker might go on the fritz.

Binaural Null. Here's a high sounding term for a phenomenon that occurs in most aircraft cabins. If you get your head in the right position and at just the right angle, you can find yourself in an aural dead spot where you can't hear the speaker. If you move your head, or turn it slightly, you'll get out of the dead spot.

We're not trying to sell head sets, mind you; we don't even make 'em. But you're looking for trouble if you don't have one handy — not way back out of reach on the hat shelf, but up front *plugged in.*

Have you seen the new NARCO NOTAM? It's our new four-page bulletin covering news on radio developments, installations, procedures and a little Narco propaganda. Comes out every other month. If you'd like to receive it, just drop me a note.

Tail winds always,

Nancy

NARCO • Fort Washington, Pa.

P.S. In case you didn't see it in Airman's Guide, don't fly under blimps when they're over water. They might be dropping ballast or towing a dunking sonar. Thought you ought to know.

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More Narco Omnigators are in use in business aircraft, operating IFR and VFR, than any other radio unit. More Narco Omnigators are being built and sold than any other unit of its type.

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Weighing only 18 pounds, complete with separate power supply, the Omnigator Mk II provides five different navigation and communications functions in a single, space-saving, easily installed unit.

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1. ILS LOCALIZER for accurate instrument approaches.
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3. CRYSTAL-CALIBRATED VHF RECEIVER gives quick, precise Simplex tuning.
4. 75 MC MARKER beacon receiver for ILS, LF range and en route position indication.
5. VOR NAVIGATION. ±2° certified accuracy with large scale course selector.

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Dual Omnigator Mk II installations are becoming increasingly popular as the perfect answer for dual navigation and communications units for IFR reliability. This combination gives you 54-crystal transmitter capacity with all basic frequencies duplicated, dual VOR, dual ILS localizer, dual 75 mc marker beacon, dual VHF receivers—all at extremely moderate cost, light weight and with traditional Omnigator reliability.

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Many advantages in aircraft usefulness are offered by the beautiful new Trecker Gull, only new-production twin-engine amphibian on the market. It has land-plane performance with two efficient Lycoming pusher engines, two large cabin doors and a large cargo compartment.

only — the addition of aileron control increases drag and causes a good air speed reduction.

We learn the importance of knowing where our wheels are before any letdown is made for a landing — everybody has heard of pilots landing amphibians with wheels up on runways and all water pilots know that it is asking for your number if you ever lower your wheels for a water landing. It is not CAA mandatory, but I believe all amphibs should have a green landing gear "down" light marked "land" and an amber landing gear "up" light marked "water." But regardless of these lights, the gear position should be checked visually for each operation.

Our First Water Landing

For our first water landing, we choose from three types available — keel landing, semi-keel landing and full-stall landing. Our first will be the keel landing. Then we'll do the others. Clearing our area by dragging it and making a careful cockpit check including gear position, we start our approach and prepare to familiarize ourselves with water drag or friction. The total inches of hull area coming into contact with the water creates water drag. It tends to pull the nose down, so it is necessary to overcome this drag with up elevator pressure. But if too much elevator pressure is applied on initial contact and the hull touches the water above stall speed, the airplane may be deflected off the water and into the air until forward speed is reduced to or below stall speed. The important thing here is not to open the engines upon being deflected from the water — if one engine takes hold and the other doesn't, brother, you've got a wing in the water. That's why we found out earlier about maximum power and minimum air speed.

Upon initial contact with the water, if no back elevator is applied, the drag tends to lower the nose due to the free forward force of the wing being superior to the drag force on the lower hull surfaces. We avoid this because the windshield doesn't give good forward visibility under the water. If this gives the impression water flying is strenuous or hard, we have missed our point. All we're trying to do is point out some of the factors involved in a dual operation that may never be considered in a land operation, where they just don't exist. Believe me, once you are an amphibian pilot, you'll love it. If you like to fly and like boats, you'll find this an ideal combination.

Still in our approach, we use flaps as desired and, as power is reduced, trim tab is used to maintain approach speed. We level off and try to contact the water in a keel or flat position, regulating our glide path with power. If there's excessive speed, we can coast it out the same as on land. Making contact, we have closed the throttles and all we apply now is whatever elevator pressure is necessary to prevent the nose from digging in. As speed decreases, we bring the wheel all the way back and the airplane falls off the step. As the water spray-line travels forward to fall off the step, it's a good idea to up the flaps at this point to prevent them from catching the spray. Boy, it's wonderful — here we are on the water with an airplane that doubles as a twin-engine boat.

Water Handling

Being a boat as well as an airplane, the amphibian has water characteristics we must learn in developing a technique for it. Under a no-wind condition, our turn radius is a known factor and we can estimate the distance required for a turn on the water. But since the amphibian always weather-cocks into the wind, our turn radius is regulated by wind velocity. In a good wind, it may be necessary to make a semi-step, down-wind turn, using power from both engines and keeping on the pivotal keel-point of the hull.

Consider the forces involved and you'll see it more clearly. Buoyancy is the first force involved because the airplane is floating on top of the water. The hull of an amphibian must be made large enough so that before it sinks too deep, it will displace a weight of water equal to the entire weight of the airplane. If a one-foot cube, for example, is submerged in water so that the top of the cube is three feet below the surface, there is a downward force on the top of the cube. Also, the liquid exerts an upward force against the bottom of the cube. We are interested in the difference between these two forces, arrived at as follows:

$F = AHD = Ft.^2 \times 4\ Ft. \times 62.5 \frac{lb.}{ft.^2}$ equals 250.0 lbs. on the bottom of the cube.

$F = AHD = Ft.^2 \times 3\ Ft. \times 62.5 \frac{lb.}{ft.^2}$ equals 187.5 lbs. on the top of the cube.

Subtracting, we find 62.5 lbs. more force on the bottom than on the top of the cube and this force brings up the submerged cube. Because a floating object loses all its weight, it displaces a weight of liquid equal to its entire weight. This relationship is known as the law of flotation.

Now, let's consider hull design, because it controls water handling and general characteristics. The vee of the hull regulates the amount of water the hull draws. Here a compromise must be reached, as is usually the case in all aircraft design. The steeper vee results in better directional control and the ability of the airplane to be maneuvered on the step at higher speeds. But due to keel depth, the steep vee offers more water resistance fore and aft in short turns. When maneuvering on the water, we are concerned with the following forces: Airplane weight — downward force; buoyancy-upward force; wind and drag-water current; hull water pressure-drag; and turn-inertia. We have engine power to overcome these forces. If no wind exists, we find that we can turn easily, right or left, with the engines idling. Visually, a no-wind condition gives us smooth water; a

(Continued on page 42)

CAPITAL AIRLINES

Selects NARCO Sapphire 1016 radio

Narco Sapphire 1016 all-channel VHF communications units have been selected by Capital Airlines for installation in their entire fleet of DC-3 Capitaliners.

Operating principally within the "Golden Triangle" high-density IFR area, Capital's Sapphire 1016-equipped aircraft will have complete coverage of every civil frequency in use or contemplated—with 50 kc spacing. The Sapphire 1016 provides 360-channel transmitter capacity and 560-channel crystal-controlled receiver capacity including all NAV channels, from 108 to 135.95 mc.

Capital Airlines selected the Sapphire 1016 after careful evaluation of all available equipment and exhaustive on-line testing of the Sapphire 1016. From the standpoint of weight, flexibility, performance and cost, the Sapphire 1016 proved far superior.

The Sapphire 1016 has become the logical choice for hundreds of pilots operating executive aircraft, too. If you are interested in airline quality at sensible cost, investigate the Sapphire 1016. See your Narco dealer or write for brochure.

FOR MAXIMUM NAV/COMM FLEXIBILITY - NARCO Sapphire 1016

TSO'd for scheduled airline use. Provides automatic crystal-controlled operation (SCS or DCS), or independent transmitter and receiver crystal selection, with optional dual control heads. Receiver range covers 108 to 135.95 mc including all NAV frequencies permitting crystal-controlled NAV tuning when VOR/ILS NAV unit, such as Narco VOA-3, is attached.

Send for brochure and data on amazing new "2½ Sapphire 1016" system.

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National Aeronautical Corporation, Fort Washington, Pennsylvania

MARK OF THE FINEST COMMUNICATIONS

Sapphire 1016

90/360-CHANNEL TRANSMITTER
90/560-CHANNEL RECEIVER

Business Flying Center At San Jose

WILLIAM Blackfield has established Pacific Aero Industries at the San Jose, California, municipal airport site formerly occupied by Liddell Aviation, completely modernizing the facilities as a complete business flying center for servicing aircraft up to airliner size. Serving the busy San Francisco Bay Area, Pacific Aero Industries is a Piper sales and service dealership. In addition to aircraft servicing, modification, radio and electronic service and metal work, the firm has a lounge, restaurant, weather teletype, accessories and parts department and aircraft and auto rentals.

Pacific Aero's lounge and sales office for parts and accessories are shown in these photos. Ten thousand square feet of space is allotted to display of Piper aircraft models.

MITCHELL AUTOPILOT

(Continued from page 29)

flight pattern with accuracy and makes better climbs, let-downs and precision standard rate turns than your hands and feet can accomplish.

From a safety standpoint, the autopilot's most important implication is for saving lives of the non-instrument pilots who are forever inadvertently getting their nose into bad weather, causing the shocking fatality figures the industry has been suffering during the past two years. While the only sure cure for such ill-equipped pilots is to keep out of the weather, the autopilot will get them out with a perfect 180-degree turn by simply turning the DG knob and reversing course.

It is also most useful for radar vectoring as you simply turn the DG knob to any heading being required by the radar operator. Since each unit is calibrated for each specific aircraft type, let-downs can be made by simply pulling back the throttle and a standard rate of descent will be made at a safe speed above the stall warning horn. Increase the throttle setting to cruise and you assume level flight and return to constant altitude and direction.

Mitchell has received, as have all automatic pilot manufacturers, many testimonial letters of how the equipment has saved lives. But the most dramatic is a recent letter from a Bonanza pilot who started East from the West Coast and passed out at 16,000 feet due to malfunctioning of his oxygen equipment after a gas stop at Tucson, Arizona. Fortunately pure oxygen started flowing again and he came to over Tucumcari, New Mexico, in time to make a satisfactory landing and get to a hospital. The Mitchell carried him through.

Disengagement is easy, either by pulling the two engaging handles or by simply over-riding the autopilot manually. For example, if a near-miss condition exists you can make any abrupt change in flight attitude or direction with wheel and rudder. If you kill an engine, say by mixture control or fuel starvation, the airplane will establish a pre-set safe rate of descent. Also you can push full throttle in nose down position and the airplane will never exceed the red-line speed. An interesting demonstration is to put the airplane in an abrupt climbing turn or steep spiral dive and engage the autopilot. Loads are limited to 1 g or less.

Last month at an OX-5 Club meeting in Oklahoma, we visited with Phillips Petroleum Company's Billy Parker, one of the great pioneer airmen of all times who is still flying after more than forty years of active pilotage. He gave us a copy of an old aviation magazine printed in 1916 in which he had a story as the developer of a controllable pitch propeller. An advertisement in this old magazine made us realize how very long we've had automatic pilots. This ad reads:

"The Sperry Automatic Pilot
"(Aeroplane Stabilizer)

"It permits the selection of an aeroplane with the highest efficiency in speed and climbing capacity without regard to other factors. It renders the aeroplane a platform which is not only steady but is held in constant relation to the horizontal."

But it is only within the last few years that developments in the automatic pilot field have been such to permit real hopes every airplane will someday be equipped with them. It is now apparent that every pilot who can afford to buy a late-model airplane can afford to go a few dollars more for

THREE DIRECTIONAL — ALL TRANSISTOR

MITCHELL AUTOMATIC PILOT

PRICE: $2,425.00

CAA Approved:

BEECH—Bonanzas (all models)
CESSNA—Models 172, 180, 182
NAVIONS—Single and Twin-engine
PIPER—Apache, Comanche, Tri-Pacer
Others Pending

Flying the MITCHELL AUTO PILOT *can be as relaxing as above — but we still recommend that you keep the eyes open and the head turning.*

NATIONAL DISTRIBUTORS

Aviation Supply Corp., 111 South Franklin St., Tampa, Florida
General Aircraft Supply Corp., City Airport, Detroit, Michigan
The Don Horn Company, Box 3736, Lamar Station, Memphis, Tennessee
General Aviation Supply Company
Lambert Field, St. Louis, Missouri
Love Field, Dallas, Texas
Municipal Airport, Houston, Texas
Will Rogers Field, Oklahoma City, Oklahoma
Sky Harbor Airport, Phoenix, Arizona

the ease of flying and safety protection such equipment offers. We have seen what reliable navigation and communications equipment has contributed to commercial aviation during the past decade. With autopilots such as the transistorized Mitchell and other developments in the mill, it is safe to say that the next decade, beginning now, will be the age of autopilots. Then watch the safety figures change, airplane sales go up and the insurance rates go down!

BOATS AND WHEELS

(Continued from page 38)

moderate wind makes for average water and a high wind creates rough water.

In a moderate wind, we cannot make turns with engine idling because the wind force contacting the wing leading edge and vertical fin keeps the airplane weather-cocked into the wind. In this condition, if we attempt to use power from one engine and rudder in the direction of the turn, we are trying to force the airplane into the turn to overcome wind velocity and we create more keel pressure. The accepted practice for this condition is to apply power to both engines with wheel back. After the nose comes up, due to down elevator deflection, rudder is applied in the direction of the turn and power on the inside engine is reduced.

The largest drag force will exist when the airplane has made 90 degrees of the turn, or the hull and fin come broadside with the wind. After passing through the first 90 degrees of the turn, power should be reduced on the turn engine and only whatever power is necessary should be used to maintain the airplane in the downwind direction. The elevators are kept in the down position so that the wind force tends to push the tail down. We also note that aileron can be used during the turn to help offset turn inertia and that the rudder will give a reversal effect if the wind force is greater than that produced from the propellers.

The higher the velocity of the wind, the larger the turn radius. Never try to force the airplane, but attempt to accomplish the desired results with minimum power and maximum control to overcome existing forces acting upon the airplane.

Getting Off the Water

But let's get back into the air — after we straighten out one thing — "porpoising." This word is misused many times and in many cases because of misunderstanding. Maybe this little discussion will clarify the situation. Porpoising can only result from take-offs and it is largely due to pilot reaction. We say take-off because any action such as the airplane coming out of the water on landings is deflection and this cannot be defined as porpoising. Let's assume we are using a G44A for our transition. Remember that we mentioned earlier that we should know the minimum effective control pressure with speed or acceleration? Now you can see why. In the case of our G44A, we note that the lowest hull point is reached in the immediate vicinity of the step. The step is incorporated in the hull design to permit the airplane to plane on the water and lessen the water drag on the aft portion of the hull. We also note that the keel line slants up from the step to the tail. Let's also note that the forces encountered on take-off are engine torque and water drag.

For take-off, we complete engine run-up and cockpit procedures and roll in full aileron, applying rudder to counteract for engine torque and full wheel back-pressure, or up elevator. We can lead with engine power also to help overcome torque. Now we consider our water conditions. In rough water, we want to get through the spray line as soon as possible to avoid propeller damage. In average or smooth water, we can ease the airplane up and over the spray line (this spray line is defined as the water wake created by the forward motion of the hull through the water).

As the airplane accelerates, the nose comes up and we find that back elevator pressure must be released to prevent the nose from coming up too high. We anticipate vertical action of the nose and lead with elevator pressure until such speed is reached to make the elevator action more positive. As speed is reached and compensation for torque is released, we must feel the pivotal point for the keel with elevator pressure. Any forward pressure tends to push the nose down, thus increasing water resistance and reducing acceleration. Too much back pressure will result in the back step-portion of the hull coming into water contact to create drag and reduce acceleration.

It is a combination of this action that results in a porpoise. Each oscillation of a porpoise becomes more pronounced due to increased speed and pilot reaction. So we anticipate the nose action on water take-off, leading the airplane until control pressures become positive. We never attempt to ride out any porpoise action on take-off — we simply close the throttles and start over.

To become familiar with the effects of lagging or leading this control, we start another take-off and as soon as we get on the step, we reduce power just enough to keep the airplane in a fore and aft planing position. This way we find the proper amount of elevator pressure to maintain this step position. Because we have a high engine thrust-line and a low hull-water drag-pressure line, this last force must be reduced with elevator pressure only and it can be reduced to zero only after flying speed is reached. Otherwise the hull goes back into the water. The hull can be deflected out of the water before flying speed is reached by the bow coming into contact with swells or waves. In remembering about buoyancy, we always satisfy ourselves about the amphibian's center of gravity location because any out-condition can certainly foul up our water operations.

In making several runs on the step at reduced speed, we can not only get the feel of elevator control but can notice our backward water travel spray line as we accelerate to get on the step and the forward spray line as speed is reduced and we fall off the step. In addition, we obtain good practice in counteracting for engine torque.

Now we'll go ahead and complete a take-off. After getting on the step, we apply whatever elevator pressure is necessary to hold the minimum keel-water drag pivotal point and find that as soon as flying speed is reached the airplane leaves the water. This can also be detected by the diminishing hull-water vibrations or reduction of hull-water impact pressure. We make several take-offs and landings, each being a keel landing and a normal take-off.

Semi-Keel Landing

The semi-keel landing is something else. It is used where average water conditions exist but the water is not rough enough to demand a full-stall landing. In initial contact with the water, the nose is slightly higher than in a keel landing and the air speed is reduced with altitude, using engine power to control the rate of descent. In addition to using the semi-stall landing in average water conditions, it is also mandatory to use this type of landing on still or glassy water when the water is clear, making it possible to see down into the water. In this condition, we do not actually know exactly where the top of the water is and the proper procedure is to set up our landing sequence, keeping our vision on the shoreline and landing parallel to the shoreline. This can only exist in a no-wind condition. If landing on a lake with hills or mountains

in the background, the water line can usually be distinguished by an eroded water mark.

After setting up our landing sequence, we use a combination power descent, keeping a good safety factor above the stall speed with a very small rate of descent. When the water contacts the hull, we close the throttles and avoid applying full elevator as initial contact is made because the airplane has made contact above stall speed and any elevator pressure will make the airplane skip back into the air. If this action should occur, we would ride it out with elevator pressure. The rule is to maintain the same pressure used in the approach. After water contact, as forward speed diminishes, we apply full elevator back pressure to keep the forward section of the hull as high above the water as possible. This keeps the spray line, which travels forward, out of the props.

Full-Stall Landing

For rough-water conditions, we will use a full-stall landing. After using a normal approach with full flaps, sufficient engine power is used to execute a full stall — as close to the water as possible. As soon as the wing stalls, throttles are closed and the aft section of the hull comes into contact with the water first, the attitude of the nose being rather high.

Unless the airplane is fully stalled on water contact in a full-stall landing, it will come back out of the water. Should this occur, we would not recover with engine power because if only one engine catches or takes hold and the other does not in this almost-stalled condition, the yaw cannot be held. This is why we took time earlier to familiarize ourselves with just what our maximum power and minimum air speed were — remember? However, under the recovery condition during the full-stall landing, we have absolutely no altitude safety.

Pusher Advantages

Now let's consider the modern amphibian, the only multi-engine one being the Trecker Gull. It is different in one important aspect because it is a pusher, so we want to consider the difference between a pusher and a tractor. While I am personally a Grumman man, I want to be open in considering all factors and all of us should be open-minded about this. For if we believe the commercial aviation age is becoming jet conscious, then we will want to really evaluate the pusher because who ever saw a tractor-driven jet plane? My experience has included test flying amphibians for Consolidated and jets for Lockheed, being one of the first 25 jet pilots in America.

The tractor airplane prop forces air over the airfoil section. The pusher pulls air over the airfoil. Both have a thrust line. However, when power is decreased on the tractor, the thrust force is reduced and the nose tends to drop. On the pusher, when power is reduced, the nose tends to rise. Therefore we have a trim reversal between the two types of tractor and pusher airplane in power reduction. On applying power the same condition exists except in the reversal of directions. This condition sets up a critical take-off or pivotal step-point position on the tractor amphibian, whereas the Trecker Gull pusher has no critical water step travel position. The Gull is, therefore, more forgiving than any amphibian I have ever flown.

Water take-off can be made in the Gull without applying elevator pressure and when flying speed is reached, we pull back the wheel and leave the water. We never do this in any amphibian except the Gull or a pusher type. The Gull is leading the field as more and more pilots become familiar with its advantages. It has had only a few minor items which needed correcting and they are being worked out. The pusher has much to offer in superior safety to personnel when docking or making a buoy. These operations are made from the bow and the person making them is not confronted with two props running just behind him as in a tractor amphibian. Fingers and hands have been lost while being pointed out the window of a tractor amphibian. Ground personnel never approach a tractor from the front when the engines are running and they never approach a pusher from the rear. If we ever get into jet plane operations, we certainly do not want to sell the pusher short.

In evaluating the pusher Gull, let's not jump to conclusions and accept things just because they exist. Let's consider all factors, including entrance to cabin, cabin space, ground handling, take-off or accelerated performance, location of controls, tabs and other items — water handling, turn radius, L/G brake action, critical hull-water step travel, single-engine efficiency, visibility, comfort of seats, operational costs, performance, maintenance and the like. When we total the score and grade the answers by their importance to safety, we will surprisingly find that the pusher leads. I have found the Gull superior to other amphibs in the same weight class. Much progress has been made in improving the performance of the amphibian. Speeds have been increased to make the speed penalty for owning an amphibian very small when compared to a landplane and utilization. The medium-powered amphibian is not much slower than landplanes of the same horsepower. When amphibian development has reached even air speeds with landplanes, we will see many more amphibians around, even if they make only a few water landings a year and are used almost exclusively for land operation. In this respect, we can remove the wing floats for land operation and this alone will increase the indicated air speed by 5 mph.

If the reader has found this discussion interesting, the time for preparing it was well invested. A pilot receives very little time on amphibious check-out as all conditions encountered during these operations can not be simulated in any one geographical location. Therefore the reader, as a member of the amphibious clan, must make his own decisions — without help. If your decisions are right, you will have a successful operation. So use your head. Study conditions as you encounter them. Then you, too, will join me in saying, "There's nothing, absolutely nothing, like amphibian flying!"

New 4-place, 180-hp. Skimmer Amphibian

NEWEST amphibian on the market and only single-engine amphibian now in production is the 4-place Mark 4 Skimmer, developed from the efficient little 3-place Colonial Skimmer. The 4-place Mark 4 cabin has 8 inches more length than the spacious 3-place Skimmer. It is powered by a 4-cylinder 180-hp. Lycoming engine with pusher propeller, as compared to the 150-hp. Lycoming in the 3-place. At a 2,350-lb. gross weight, useful load is 825 lbs., top speed is 136 mph. with an economical cruise of 128 mph., and rate of climb of 1,200 fpm. John Strayer's Amphibious Aircraft, Inc., Teterboro Airport, N. J., is marketing the Skimmer Mark 4, having contracted for all of the production from Colonial Aircraft Corp., Sanford, Maine, which developed the popular all-metal Skimmer series. Amphibious Aircraft thus becomes the sales company for the Skimmers. The 4-place is priced at $21,700 and the 3-place at $19,600.

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Piper has established a world-wide network of Factory-Certified Service Centers to assure you of the finest service possible for your Piper airplane. To earn the coveted designation, service organizations must meet rigid requirements, must be properly equipped and staffed by personnel who have attended the intensive service school conducted at the Piper plant. Dozens of Piper Factory-Certified Service Centers have been established throughout the nation and around the world, and more are being designated to assure convenient and competent Piper service wherever you may wish to fly.

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Gallup, New Mexico

BROWNING AERIAL SERVICE
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HOmstead 5-1728
Austin, Texas

DES MOINES FLYING SERVICE, INC.
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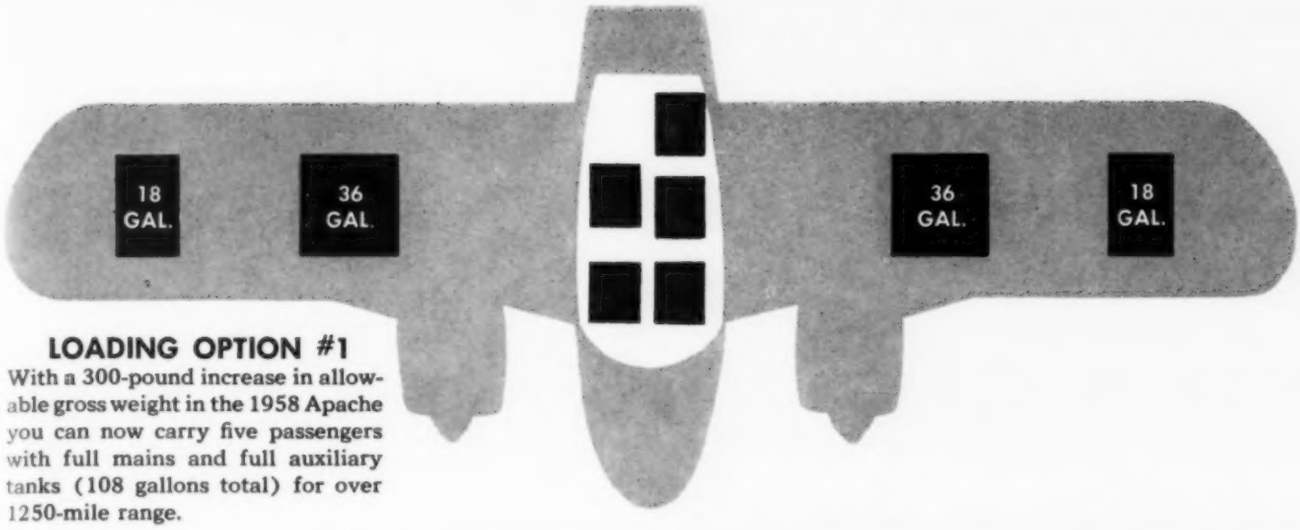

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With a 300-pound increase in allowable gross weight in the 1958 Apache you can now carry five passengers with full mains and full auxiliary tanks (108 gallons total) for over 1250-mile range.

1570-POUND USEFUL LOAD

WITH SPACIOUS ELEGANCE

You'll be pleasantly surprised at the roominess, comfort and quiet luxury which Apache transportation affords. It is by far the roomiest airplane in its class, with full five-place capacity plus full fuel load!

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Get set for a surprise. Fly the 1958 Apache with new high-compression 160 hp Lycoming engines. $35,990 with 160 hp; $34,990 with 150 hp. See your Piper dealer, or write for new brochure, Dept. 14-F, Piper Aircraft Corporation, Lock Haven, Pennsylvania.

PIPER *Apache*

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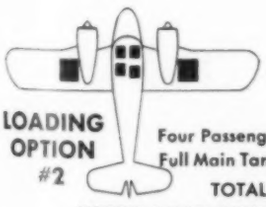
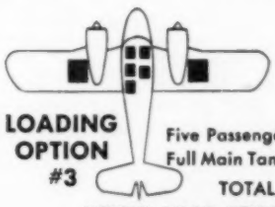


LOADING OPTION #2
Four Passengers .... 680 LBS.
Full Main Tanks & Oil 464
TOTAL LOAD 1144
USEFUL LOAD REMAINING 426



LOADING OPTION #3
Five Passengers .... 850 LBS.
Full Main Tanks & Oil 464
TOTAL LOAD 1314
USEFUL LOAD REMAINING 256

LOADING OPTION #4
For Freight Use
Pilot ..... 170 LBS.
Full Main Tanks & Oil 464
TOTAL LOAD 634
USEFUL LOAD REMAINING 936

PIPER

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MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

CAA Relief Needed by Aircraft Shops

Compliance difficulties work hardship in confusing STC program

EVERYWHERE you fly these days you run into aero repair shops, airplane modification centers and small manufacturers who are suffering from the burden of CAA supplemental type certification of various components, modifications and changes in airplanes and components.

It used to be a simple matter to improve an airplane in various ways and get the improvement or modification approved on a simple form, No. 337. Now this form has been abandoned for all intents and recently-adopted regulations establishing a highly complex *supplemental type certificate,* particularly in the form of engineering data required, has been imposed. Only last year did the burden of such procedures start showing up when the CAA apparently started a crack-down by implementing the new regulations.

The CAA divides aircraft modifications and changes into two categories — major and minor. Supplemental type certification is required of all major changes. Because of vague interpretation of what is major and what is minor, every repair or modification has been considered a major one and the long rigamarole of STC has been required. As a result, many aircraft are sitting around on the ground waiting for the long process — sometimes four to five months — for CAA engineers to check the engineering data. Even worse are those cases where the owner in disgust goes ahead and flies the airplane without certification, creating a situation where, in many instances, they are flying an "unairworthy" craft, according to Civil Air Regulations.

Last fall an industry committee was formed to take a vote of the people being affected by the new requirements and to approach the CAA for relief from the interpretation as well as the administration of the STC program. The committee did not recommend to the CAA that the STC program be dropped but that definitions of what are minor alterations and what constitutes a major alteration or repair be re-written and that the field forces of CAA be alerted to the hardship cases produced by the requirements so that a more practical interpretation and administration of repairs and alterations would result.

The industry committee met with the CAA Administrator and his staff in December, submitting a completely documented report on the situation in general and specific hardship cases being experienced by the shops. The CAA has promised to look into the matter and find a solution toward at least moderate relief.

But as past experience and history have taught us, it is easy to get regulations on the books in Washington and next to impossible to get them off — or even changed. In one of the Washington meetings a CAA staff member was told that if present interpretations of the STC regulations were not relaxed a lot of shops, particularly small ones who can not afford a staff of hard-to-get and highly paid engineering talent, would simply go broke. The official stated blandly, "We're not interested in the economics of the case."

While his is not the universal attitude of the CAA, or even that of the majority of the people in Washington, it does reflect a minority opinion that spreads out into the field and is perhaps the biggest hurdle the industry has to break down before any changes come about.

The industry is grateful for the assurance from top CAA people that something will be done. It is not clear just now what will be done, or when. But the sooner the better or chaos will develop out of the present costly confusions and loss of time, money and business the aero repair companies are now experiencing.

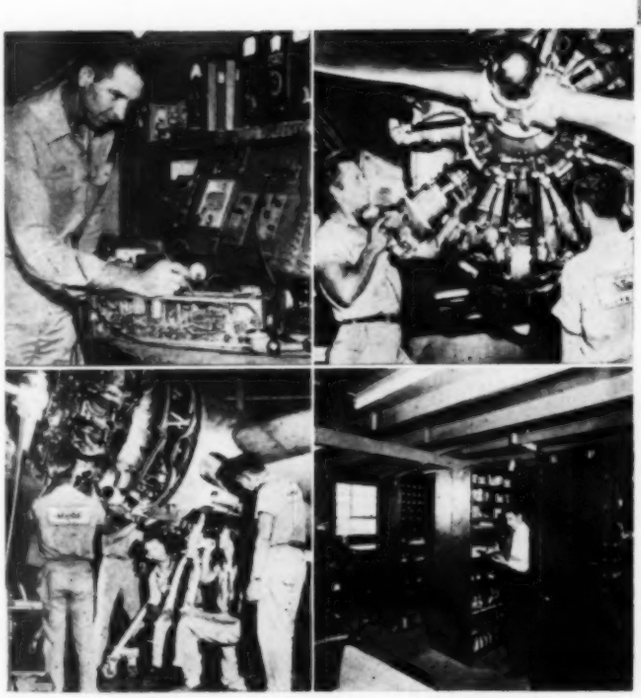
Fortunately for the shops — and the utility plane owners, several national aviation trade groups are getting interested in the problem. Perhaps they can slow the march to inevitable chaos by helping to find the solution and by camping on the CAA's doorstep until relief definitely comes. Since the industry is not seeking the elimination of supplemental type certificates for "major" repairs and alterations we feel confident that the best brains within the CAA can provide sensible and workable interpretations and administrations that will consider the economic aspects of the matter as well as over-all aviation safety.

Scores of large and small aircraft shops located in all geographic areas of the nation have reported case histories of STC difficulties and hardship to the industry committee which is seeking relief from CAA. Only a casual examination of the case histories is necessary to obtain a clear understanding of the STC program's widespread confusion and its handicaps on shops and customers alike. Here are just a few actual cases:

Installation of a rotating beacon was called to attention of CAA but no word from CAA was received after eight weeks. CAA was then notified again but had not been heard from five months later. Five-month delays in STC approval are the rule in this area. Installations involved include beacons, ram's horn antennas, Janitrol heaters,

(Continued on page 50)

When you get caught with your "PLANE" down . . .



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If you find yourself delayed as a result of some electronic, radio or mechanical aircraft problem — the J. D. Reed Company is the firm that will get you off the hook and back into the air in minimum time.

First of all, we are specialists in trouble shooting. For over a quarter of a century we have devoted our full efforts to serving aircraft owners over the nation. We have handled every possible kind of aviation problem and in each case provided our customer with a prompt and economical solution.

Secondly, to expedite the work performed in the J. D. Reed Company shops we have installed the latest equipment and machinery that has been designed for each specific purpose. The right tools . . . in the hands of our factory trained technicians means a better job in less time. A real savings to you!

Important too, is our large stock of factory authorized parts and accessories — one of the most complete to be found anywhere. Our service and maintenance departments, here again, are able to reduce your "down-time" through the ready availability of the necessary parts and accessories for your job.

It's good business to RELY on REED for all your aircraft service and maintenance requirements.

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Dal-Tex Aviation, Inc.
Highland Park Airport and Love Field
Dallas, Texas

Executive Aircraft Company
Municipal Airport
Kansas City, Missouri

Hair Flying Service
Harding Field
Baton Rouge, Louisiana

Poelman Aircraft Co.
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Municipal Airport
Austin, Texas

Kenneth Starnes Aviation Service
Adams Field, Little Rock, Arkansas

Southwestern Skyways, Inc.
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and Ogden, Utah

Sunny South Aircraft Service, Inc.
Broward International Airport
Fort Lauderdale, Florida

Walston Aviation, Inc.
Civic Memorial Airport
East Alton, Illinois

Yingling Aircraft, Inc.
Municipal Airport
Wichita, Kansas

SERVICE SATISFACTION

SMILING SERVICE is what you expect and always receive when our Authorized Cessna Service Stations solve your maintenance needs! We furnish factory skills, factory equipment and factory satisfaction. Cessnas are our specialty . . . and we follow a policy of giving Cessna users a little more, a little better service — LIKE OUR FAMOUS 1-2-3 CESSNA FLAT-RATE SERVICE!

1 You get an accurately quoted price and time-required quotation based on hundreds of job studies covering virtually all maintenance needs.

2 You get genuine Cessna parts and factory-trained workmanship.

3 You save money and time and we stand behind every job for your fullest satisfaction.

MEET THE **WBAALT*!** NEW CESSNA 310B

CLIMBS 415 F. P. M. ON ONE ENGINE!

More power per pound of weight than any other business twin! That's what you gain with the new Cessna 310B—the kind of power that lets the 310B climb 415 feet per minute on one engine while fully loaded with 5 passengers, gives you a smoother 213-mile-per-hour ride.

But doesn't all that power make more noise? Not in the revolutionary "Comfort-Sealed" cabin of the new 310B! This completely new and roomier kind of cabin is *completely* insulated and sealed against sound from floor to ceiling. Its windows and windshield are *double-heavy* and *vibration-free*. A quiet, roomier cabin; fully retractable landing gear; safety-tip tanks; broad-span tail group; powerful Continental engines in flat engine nacelles . . . these are just a few of dozens of way-ahead features of the new, more comfortable, easier-to-handle 310B. Price: $59,950 f.a.f. Wichita. Call your Cessna dealer (see Yellow Pages of phone book) or write CESSNA AIRCRAFT COMPANY, DEPT. FM-22, Wichita, Kan. Inquire about Cessna Lease Plans.

**World's Best All-Around Light Twin*—Winner of the recent U. S. A. F. light twin competition.

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4 GREAT CESSNAS 172 180 182 310 THE COMPLETE AIR FLEET FOR EVERY BUSINESS NEED

CAA RELIEF NEEDED

(Continued from page 46)

nose radio racks, auxiliary fuel tanks, and the like. Operator involved says: "We have had cases of loss of business because of these and even shorter delays. The customer's attitude is to go without the installations unless we can accurately quote delivery dates and costs — this accuracy is impossible under STC confusion in CAA. If this continues, a CAA-approved repair station such as ours will be reduced to nothing more than running 100-hr. checks and periodic inspections. This is a heavy blow to us because 75% of our business is modifications and changes to aircraft, bringing them up to date with new and improved equipment for better utilization and improved safety factors."

Another operator sums up numerous difficulties he has experienced as follows: "The present method of approved supplemental type certificates is inadequate and causes a definite slowdown of schedules, thereby increasing costs to the point where few aircraft operators can afford to make major alterations on their aircraft."

In another CAA region, an operator says: "We were unable to sell and install much-needed fuel flow meters to solve certain engine problems because of difficulties in obtaining CAA approval."

"It looks to us as if the STC program is discouraging all the industry from installing accessories, with the exception of aircraft factories," another says. "It is forcing loss of most of our sales of aircraft radio and equipment."

A small Texas operator writes: "In three instances, our firm has had customers sell their airplanes rather than wait out the delays necessary to obtain STC approval and other simple modifications approved in another way."

Here's the comment of a supply firm: "It is increasingly difficult for our company to sell radios and other accessories for installation in the field. Several of our customers will no longer attempt to install such items as rotating beacons, radios, oxygen systems, etc. since they claim it is almost impossible for them to obtain approval on such installations. We feel this program is basically sound but that it is unreasonable for the CAA to expect an owner or operator to lose the use of the airplane for extended periods while the CAA is asking for engineering approval."

Another small operator reports this: "We have obtained three supplemental type certificates and we were approximately six months from the time we applied for them until we received our numbers. This works an undue hardship on our shop and our customers. We would like very much to have some relief in this matter."

This was received from an aircraft distributor: "This STC program has created a very serious economic hardship on the purchase, sale and trading of used aircraft. We are unable to allow a customer top value for his aircraft on trade if there is even a minor discrepancy in the aircraft's records, since we have no way of determining what expense and delay we will have in making the airplane legal for resale. This has kept us from making what would normally have been profitable trades — simply because there was some minor discrepancy in the addition or deletion of equipment not properly recorded under the STC program. Usually these items can in no way affect the safe and airworthy condition of the aircraft and frequently they are items which have been installed many times before, using the same methods on the same make and model aircraft. Thus the trade has to be delayed until somebody in CAA thoroughly familiar with the STC program has evaluated the aircraft records to determine if the craft is legal. By the time this has been done, the customer is so thoroughly disgusted with STC and our indecision that he goes elsewhere or decides against trading, selling or buying anything."

After airliners park along concourse, telescoping corridors are moved to front and rear cabin doors for passengers.

Telescoping Ramps For American Airlines

TELESCOPING and moving corridors will shelter passengers and eliminate stairs for their boarding or leaving airliners at American Airlines' new $14,000,000 terminal to be completed by mid-1959 at New York's Idlewild International Airport. The new AA terminal will have two concourses with a capacity for 16 airliners simultaneously. Its revolutionary design will give passengers one-level accessibility from the time their auto or limousine arrives at the raised terminal entrance until they enter the airliner cabin. The "customer centered" terminal was designed by the firm of Kahn and Jacobs.

Front and rear-door corridors are marked by A and B. Before plane departs, rear telescopic corridor contracts and pivots clear of the aircraft (C).

AMERICAN AIRLINES FLEET NOW 100% EQUIPPED WITH BENDIX IGNITION ANALYZERS!

We are very proud that American Airlines has chosen the Bendix* Ignition Analyzer as the standard equipment for its entire fleet of aircraft. On American's four-engine aircraft the analyzer is permanently installed as airborne equipment. Two-engine aircraft are prepared for portable-airborne analyzer usage.

American Airlines has used the Bendix Ignition Analyzer for quite some time. The decision to prepare the entire fleet of aircraft for use with this analyzer was made after long usage had shown this to be the most suitable equipment for American's requirements.

Major airlines, military services, and corporate aircraft operators have found the Bendix Ignition Analyzer to be a vital and almost indispensable piece of equipment to reduce costs by improving maintenance and operating efficiency. The analyzer plays an important role in reducing en route and turn-around delays, thus improving customer convenience and satisfaction.

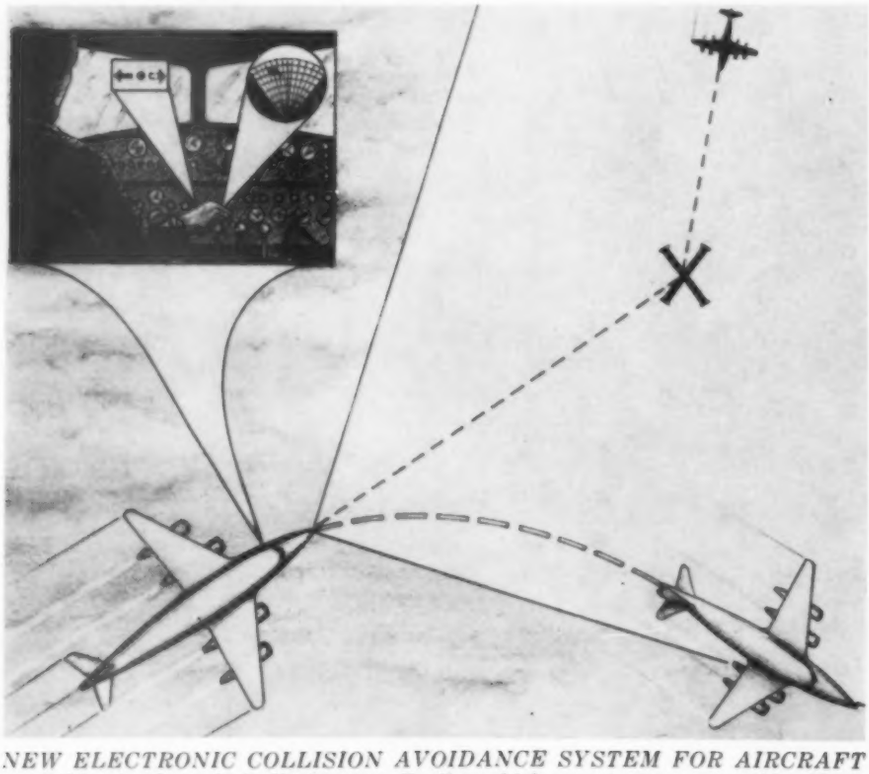
The Bendix Ignition Analyzer is a sound investment that will pay for itself within a short period. We would be pleased to provide complete information as to the most convenient and economical analyzer installation for your aircraft.

*TRADE MARK

Scintilla Division
SIDNEY, NEW YORK

Bendix
AVIATION CORPORATION

THREE-BLADE HARTZELL CONSTANT-SPEED, FULL-FEATHERING PROPELLERS are being installed on Beech D18's by Dallas Aero Service. Homer Penwell of DAS (left) is shown with Dorsey Buttram of Oklahoma City with Buttram's new Hartzell installation. Spinners had not been polished when photo was made. Penwell said the Hartzell installation weighs 146 lbs. less than the Hamilton-Standard installation, provides more efficient blades, reduces vibration and tip noise and the Hartzells have 95.5-in. diame'er as compared to 108 ins. for the older props. Less maintenance is required. This was third Dallas Aero Service installation and all included the firm's cross-over oil-supply unfeathering system. A similar installation has been made on Frank Buck's Three States Natural Gas Company D18.



NEW ELECTRONIC COLLISION AVOIDANCE SYSTEM FOR AIRCRAFT uses this simple cockpit display to tell pilot which way to turn to avoid mid-air disaster. It utilizes weather radar already carried by many airliners. Inset shows arrow signal (left) and special radar scope on which a blip, shaped like a polliwog, gives position of other aircraft as well as safest evasion route. This system has been announced by International Telephone and Telegraph Corp.

NATIONWIDE ROUNDUP:

New Business In the Hangar

REMMERT-WERNER, Lambert Feld, St. Louis, has delivered a new executive Super-92 DC-3 to Norman Woolworth's crew, Seth Boynton and Norman Danagher. It has a Sperry A12 autopilot with approach control, Bendix X-band radar, Collins 17L4-51X communications, dual Collins 51R3 omni with dual RMI and Integrated Flight System, Collins 51V glideslope receivers, Sperry H6 electric gyro horizon, Remmert-Werner lightweight landing gear doors and custom interior.

Houston Lumber Company's Super-92 DC-3 was in for installation of lightweight landing gear doors, new de-icer boots and tires. Austin Goodwin is chief pilot. . . . Chuck Wilson's North American Life and Casualty DC-3 was converted to Super-92 engines and Mississippi River Fuel's Lodestar, Ralph Primo and Ray Waldt, pilots, had an engine change. . . . Hoyt

keep your Executive Team at full strength

The "Executive Teams" of thousands of firms are strengthened by the rugged dependability of their Beechcrafts. The day in-day-out performance of these aircraft allow more executive time for urgent business . . . time for important conferences in far-away places . . . more time to explore new fields . . . more time for pleasure and relaxation.

We can help keep your team at full strength by insuring against loss of executive time by out-of-service aircraft. Servicing and maintenance of the "Business Fleet" is a specialty of our factory trained service staff. Let us check your airplane today . . . We will also be glad to explain our regular maintenance plan for greater safety — lower costs.

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ATLANTIC AVIATION CORP.
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  Teterboro, New Jersey
- Logan International Airport
  East Boston, Massachusetts
- International Airport
  Philadelphia, Pennsylvania
- New Castle County Airport
  Wilmington, Delaware

BUTLER CO., AVIATION DIVISION
Municipal Airport, Chicago, Ill.

CURREY SANDERS AIRCRAFT CO., INC.
Downtown Municipal Airport, Shreveport, La.

CUTTER-CARR FLYING SERVICE, INC.
West Mesa Airport, Albuquerque, New Mexico

GRAY AIRCRAFT SVC. CO., INC.
D. A. Cody, Service Manager
Love Field, Dallas, Texas

ELLIOTT FLYING SERVICE
Municipal Airport, Davenport, Iowa

LOPEZ GRACE AVIATION, INC.
Building No. 3 and No. 18
Broward County International Airport
Fort Lauderdale, Florida

THE NORMAN LARSON CO.
PLANESERVICE, INC. (Service Division)
Van Nuys Airport, Van Nuys, Calif.
(Los Angeles Area)

J. D. REED CO., INC.
Municipal Airport, Houston, Texas

ROSCOE TURNER AERONAUTICAL CORP.
Municipal Airport, Indianapolis, Ind.

TEXAS AVIATION CORPORATION
G. K. Roberts, Pounds Field
Tyler, Texas

TOPEKA AIRCRAFT SALES & SERVICE
Municipal Airport, Topeka, Kansas

TRADEWIND AIRPORT CORP.
Tradewind Airport, Amarillo, Texas

TULSAIR DISTRIBUTORS, INC.
Hangar 8, Municipal Airport, Tulsa, Oklahoma

UNITED AIRPLANE SALES, INC.
New Municipal Airport
Wichita, Kansas

Put Your BEECHCRAFT in BEECHCRAFT Hands

Colson and E. B. McCune took their Winn-Dixie DI8S to Remmert-Werner at Pompano Beach, Florida, for a new exterior paint job, engine change, X-ray of wheel wells, new weight and balance, gas tank overhaul, wing inspection, 1,000-hour airframe inspection and other work. . . . Also at Pompano Beach was Storer Broadcasting's Super-92 DC-3, Earl Johnson, pilot, for a double engine change.

HORTON & HORTON CUSTOM WORKS, Meacham Field, Ft. Worth, has delivered another VIP interior to George Young's Fairways Corp. of Washington, D. C., whose H & H Convair 440 interior was a Reading prize winner last summer. The new one is a weight and sound saver, using tawny beige "pure silk" vinyl headlining, cleanable mocha Naugahyde sidewalls and bulkheads, chocolate mohair couches, green and brown tweed nylon on new Hardman seats, hand-blocked gold-flecked draperies, gold anodized hardware, enlarged baggage compartments, and length-of-cabin tracks for seat mobility.

Other recent Horton & Horton jobs include the full treatment for Jack Riley's Dove include featherweight rift-oak laminate on the bulkheads, customized cabin seats with narrow-pipe chestnut broadcloth and a special 2-place stressed couch which conceals a lavatory. . . . Gardner Nagle brought his Ford, Bacon & Davis D18 Beech in from Monroe, La., for a seafoam green interior. . . . Collins Radio, Cedar Rapids, sent Vice President Jim Flynn's D18 in for a new interior in parchment and bluebonnet blue.

FEDERAL TUBELESS AUTO-PILOT SERVICE TRAINING has been inaugurated by International Telephone and Telegraph, conducted by Harold Parker for each distributor and its dealers at the distributor location. Operations were first programs were conducted included Pacific Airmotive at Oakland, Seattle, Denver and Kansas City and Dallas Aero service.

AERO CORPORATION OF ATLANTA, Municipal Airport, Atlanta, Georgia, reported the following jobs last month: Barwick Mills' DC-3, Atlanta, Carl Forrester, captain, annual inspection; Milner Enterprises' Lodestar, Jackson, Miss., Bob Barrett, maintenance superintendent, X-ray and annual; Mississippi Power and Light's D18S, Jackson, W. A. Miller, pilot, X-ray, annual and propeller overhaul; Trostel Aviation's E18S, Milwaukee, Rick Ravitts, pilot, 50-hr. and landing gear work; Coca-Cola's Super PV, New York, Ralph Whitworth, 50-hr. and miscellaneous electronic and engine work, and Monsanto Chemical's DC-3, St. Louis, Ralph Piper, chief pilot, engine change. . . . Aero Corporation's new military projects include additional helicopter and de Havilland work for the Army.

AIRCRAFT ENGINEERING AND MAINTENANCE COMPANY of Oakland, California, has started work on the overhaul and modification of a fleet of C-131 Convair hospital planes under an Air Materiel Command contract.

EXECUTIVE AIRCRAFT SERVICE, Red Bird Airport, Dallas, reported its January work included Wimpy Neal's Brown Paper DC-3, Orange, Texas, engine change; two Sid Richardson DC-3's, Ed Armstrong, chief pilot, 100-hr. checks, and a Sears, Roebuck Lodestar, Dallas, Arch Hunter, pilot, heater repairs and miscellaneous work.

THE GARRETT CORPORATION'S AIRESEARCH AVIATION SERVICE DIVISION, Los Angeles International Airport, put an exterior paint scheme on a newly-purchased DC-6A obtained by Hawaiian Air Lines. L. D. Machado, HAL vice president of operations, was on hand to take delivery of the airplane, due to return to AiResearch for complete interior modification as well as service bulletin modifications. . . . Ray Peters and L. Taska brought in Barber Oil Company's DC-3 from Houston for installation of RCA AVQ-10 radar and new Bendix DF-70 ADF's with Douglas blade-type sense antennas. . . . Texas Company's D18 from New York received double engine change, annual relicense, 100-hr., exterior painting and interior refurbishing.

AiResearch has received the first of three new Garuda Indonesian Convair 440's for installation of radio operator's station and equipment in the forward cargo compartment. . . . CAA's second of five Convair 440's is on hand for customized installation of AiResearch GTP 70-17 gas turbine power unit and RCA AVQ-10 radar. The turbine powers special electronic and electric equipment for flight checking radio navigational and communications facilities.

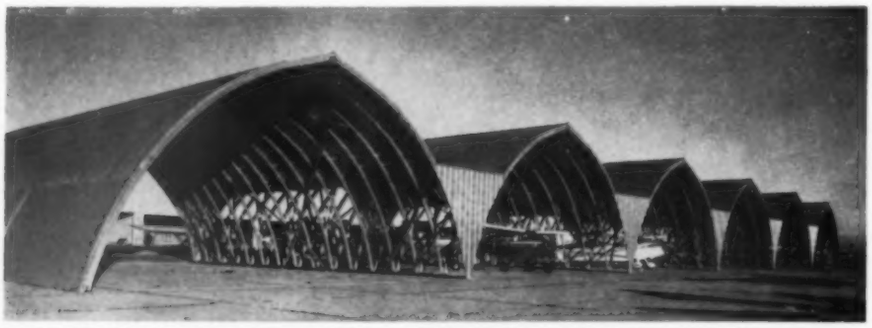
MIDLAND AERO CORP., Midland Air Terminal, Midland, Texas, is a new distributor for Aero Commanders and the new Alti-Cruiser for West Texas and parts of New Mexico and Arizona. Officers are John Brown, president; Bill White, vice president, and W. W. (Bill) Taylor, vice president-sales. Brown and White are officers of Aero Corp. of Dallas, Aero Commander distributors. Taylor formerly was associated many years with Al Mooney in Wichita, Kansas, and in Kerrville, Texas, and has held test pilot, executive pilot and aircraft sales executive positions.

J. R. GRAY COMPANY, Beechcraft distributor with headquarters at Love Field in Dallas, has appointed William B. Devers as manager of a new branch sales office opened recently at Addison Airport, new executive airport in Dallas. Devers, a retired Navy lieutenant commander, is a native of San Antonio and entered the Naval Air Service in 1936. He retired from active duty last year.

NARCO EQUIPMENT will soon carry an ink-stamped chassis number, in addition to the serial number, on the rear of the chassis. This chassis number will be changed from time to time to reflect production changes in the particular equipment, enabling service personnel to identify sets with minor changes. Future service bulletins and manuals will refer to the specific chassis numbers.

L. B. SMITH AIRCRAFT CORP., Miami International Airport has established its first Latin-American dealership with appointment of Gaston Dupuy at Caracas as authorized Venezuelan dealer for the Aero Commander. Dupuy was one of the chief pilots of LAV (Lineas Aeropostal Venezolana). His appointment was announced by G. R. Dutton, LBS vice president-sales.

Recent LBS work included: C. B. Wrightsman's Learstar, interior, exterior . refurbishing and mechanical modifications; Orinoco Mining Company's DC-3, 100-hr., interior cleanup and miscellaneous work; Rockwell Spring & Axle's DC-3, interior refurbishing; Aerodex Twin Beech, rewiring, radio and ship-to-shore telephone installation; Paul Tishman, Lodestar damage repairs; Transportes Aereos Peruanos, Curtiss CW20-T modifica-



TEMPORARY PLANE PORTS ACCOMMODATING 18 TO 24 LIGHT-PLANES have been constructed at Tucson Municipal Airport, Arizona, using prefabricated laminated wood trusses and corrugated metal adapted from standard barn roofs. Bob Schmidt, Tucson Airport Authority, said the total cost of the six units was $19,994, or from $833 to $1,110 per airplane. These units may later be moved intact if necessary, he said.

TANDBY VHF TRANSCEIVER eighing less than 5 lbs. with built-in ower supply for either 14 or 28 volts crystal-controlled and covers any 2- egacycle band from 118 to 132 mc. fits 3.25-in. panel opening and has ransmitter with 2.5-watt output. Henry J. Hamm, aviation sales manager, says it is first unit of a new "Topp-Flyte" line of commercial aircraft communication, navigation and flight control equipment to be manufactured by Topp Manufacturing Co., Los Angeles.

COMPACT TRANSISTORIZED 10-WATT AMPLIFYING SPEAKER for aircraft takes no more space than a 5-in. speaker and can be plugged into microphone jack for top quality. It is the new Dare DAS-1 and has no vacuum tubes. Amplifier employs two transistors and special thermistor in push-pull power output stage with printed circuit board and low current drain. Its 5-in. speaker has 3.16-oz. Alnico-V magnet and complete unit measures only 5 ins. by less than 3 ins. deep. No shock mounting is required. New speaker was photographed on table by cigarette pack to show small size.

—(FLIGHT MAGAZINE Photo.)

tion and 100-hr.; Varig Airlines Smith Super 46-C, complete modification and installation of AEF-Smith Kit; Trans-Caribbean Airlines' DC-6A, converted to DC-6B; Aerovias Q Airlines' DC-3, passenger interior and inspection; Langenfelder & Son's DC-3, 14-pt. inspection and modifications; G. David Schine's Helio Courier, engine change and 100-hr. inspection; Brazilian Aeronautical Commission's fourteen Grumman SA-16's, inspection and rehabilitation for service.

ADDISON AIRPORT, 8 miles northeast of Love Field in Dallas, has been approved for omni-range IFR (instrument) approach and actual commissioning of its Collins TVOR, located adjacent to the runways, is expected within a month after CAA has published procedures to be used. The Addison TVOR frequency is 111.4 megacycles, its identification is "ADS" and its exact location is Latitude 32-

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Complete ONE-STOP Service

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Firm service and repair estimates on request.

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Wichita is nearer than you may think. With its central location and outstanding airport facilities there is every reason to give your equipment the finest UNITED GUARANTEED SERVICE.

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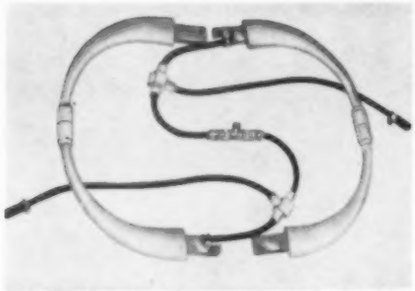


NEW VOR-ILS HALF-LOOP ANTENNA, Type DM N4-2, is an electrically-balanced loop for AN/ARN-14 and AN/ARN-19 equipment. It is available from Dorne & Margolin, Inc., Long Island, New York.

58-24 and Longitude 96-50-20. To start, Addison will use 500 ft. and 1 mile visibility as its minimums. CAA approval provides that it will be necessary for Love Field Radar to be in operation to permit simultaneous IFR approaches to both Addison and Love Field. In event radar is inoperative, IFR approaches to Addison will be conducted for minimum interruption to normal IFR operations at Love Field. Instrument clearance will be obtained by pilots from Dallas Approach Control.

DALLAS AERO SERVICE, Love Field, Dallas, reports increasing shop activity during January included the following: Fuel vent modification for

MECHANICAL RAMP MULE for moving nose-wheeled aircraft has lawn-mower engine powering friction-wheel drive. Easily attached to nose wheel, friction wheels fit snugly against aircraft tire to move the airplane. All operator does is guide the gadget, shown here with its manufacturer, Jack Baumann of Santa Monica Aviation, Aero Commander distributors. The 2-hp. "Ramp Mule" can move an airplane heavier than a 7,000-lb. Commander. Price: $350.
(FLIGHT MAGAZINE Photo.)

Aero-Copter's Aero Commander; Muleshoe Cattle Company's Twin-Bonanza converted to more powerful engines with 3-blade Hartzell props; double-engine change and control surface recovering for Frank Ernst's Franklin Supply Dove from Tulsa; Jack Riley's Dove received double engine change, propeller overhaul, spar modification, new paint job and annual; Sinclair Refining's Ventura from Tulsa, Joe Lacey, pilot, was in for repair to rudder damage from windstorm; Murphy Company, El Dorado, Arkansas, Lou Nelson, pilot, sent in its Lodestar for speed kit, complete

BONANZA with TACTAIR AUTOPILOT

Selected by Beech as Optional Equipment

There's a new thrill in flying when you switch on the Tactair Autopilot in the Beech Bonanza. Smoothly, effortlessly, the Tactair's pneumatic system holds you straight, precisely on course or makes perfect turns.

And there's new ease in flying the Bonanza cross-country, thanks to the Tactair's amazing heading lock which makes flying VOR, ADF, or ILS localizer a cinch.

New 1958 Bonanzas can be ordered with the Tactair installed at the factory, to bring you this ultimate perfection in flying ease and safety. If you already own a Bonanza (Model A on) the Tactair can easily be installed in the field.

There's no finer tribute to the Tactair's proven reliability and performance than Beech's choice of Tactair—first autopilot ever selected by Beech for the Bonanza as factory-installed equipment.

A FAR SUPERIOR AUTOPILOT SYSTEM

The Tactair T-3 operates pneumatically with no warm-up, no power drain, no tubes—so mechanically simple, yet so "human," that it makes any other flight system obsolete. Weighs only 7.3 pounds, simple to install, virtually maintenance-free.

WITH TRUE-READING HEADING LOCK

Tactair's heading lock works on the DG with no confusing zero heading. Merely set the upper card to course desired and you fly that course precisely. No complicated resetting for new course necessary.

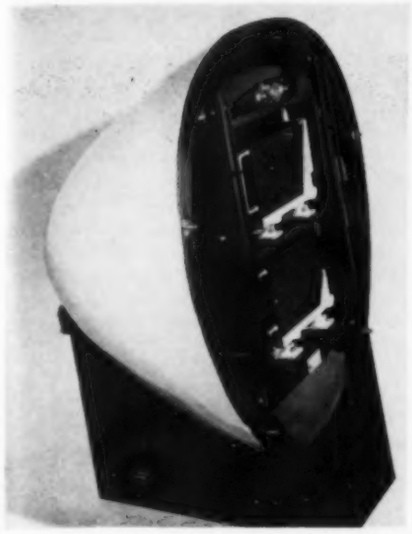
AND NOW AVAILABLE **- ALTITUDE CONTROL**

Send for new brochure describing the Tactair T-3 Autopilot and this latest optional addition.

TACTAIR® INCORPORATED AUTOPILOT DIVISION
AIRCRAFT PRODUCTS CO.
BRIDGEPORT, PENNSYLVANIA

For 18 Years Specialists in Precision Aircraft Pneumatic and Hydraulic Controls

NEW LOW-COST PORTABLE OXYGEN unit from Air Associates weighs less than 9 lbs. in a case measuring 3.5 by 8 by 18.5 ins. and costs only $59.50. *It has two cylinders, 5-ft. hose, breathing bag and mask and other essentials.*



IT'S ALL IN THE RADOME with the new Chamberlain DC-3 radome package for RCA AVQ-50 radar. Chamberlain Aviation, Akron, Ohio, says package includes antenna, transmitter-receiver and accessory unit all within the radome, wired by a prefabricated harness to a plug for connecting the indicator and controller.

radio installation, interior rework and other items; Jack Tarver brought in the Olin Mathieson Beech 18 from Monroe for left engine change, 100-hr. and propeller overhaul; Phillips Petroleum's DC-3, Earl Hanson, pilot, received a double engine change; landing gear and wing work for Steve Cummings' Mayfield Dove from Houston; 2,000-hr. overhaul for Baroid's Aero Commander from Houston; Federal autopilot installation, new interior and paint job for Swede Johnson's El Paso Natural Gas Twin-Bonanza, and relicensing of two Convair 240's for Dundell Corp., which has acquired American Airlines' surplus Convairs.

AUBREY KEIF, formerly manager of the aviation sales division of the Texas Company's domestic sales department, has been named director of Texaco's aviation sales department, a new position responsible for coordinating the company's aviation sales in domestic and foreign fields. He has been a Texaco aviation salesman since May, 1932.

LEAR, INC., Santa Monica, has named Henry M. Wales commercial products marketing manager in charge of coordinating sales promotion, market research, advertising and public relations for all non-military applications of all Lear divisions. Wales has been employed for the last 20 years by General Electric in sales and marketing activity concerned with aviation products and is a pilot with multi-engine, instrument, instructor, helicopter and seaplane ratings.

Airmen's Calendar

Feb. 16-18—7th Annual Agricultural Aviation Conference, A&M College of Texas. Contact: Joe Brusse, Research Center, Box 3FF, College Station, Texas.

Feb. 26-27—7th Annual Ohio-Indiana Agricultural Aviation Conference, Ohio State University, Columbus. Details available from Division of Aviation, Ohio Dept. of Commerce, Ohio State University Airport, 3130 Case Road, Columbus 21, Ohio.

Mar. 2-6—ASME 1st International Gas Turbine Conference, Hotel Shoreham, Washington, D. C.

Mar. 13-14—2nd National Aviation Education Conference, Hotel Mayflower, Washington, D. C.

Mar. 17-20—Joint Aviation Conference, American Rocket Society-American Society of Mechanical Engineers, Statler Hilton Hotel, Dallas, Texas.

Mar. 19-21—Aeronautical Electronics Association Meeting, Baker Hotel, Dallas.

April 16-19—14th Annual American Helicopter Society Forum, Sheraton Park Hotel, Washington, D. C.

May 16-20—16th Annual Miami-Havana Air Cruise, sponsored by Florida Air Pilots Assoc. Contact James G. Parks, Cruise Director, 310 SE 2nd Ave., Miami, Fla.

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FIRST PIPER 4-PLACE COMANCHE DELIVERY was made on January 7 to Arkansas Aviation Sales at Little Rock. Shown receiving the papers from Piper Sales Manager Jake Miller (left) is Royce Hancock. Over 30 Comanches were delivered during the rest of January to Piper distributors. The new all-metal Piper is powered by a 4-cylinder 180-hp. Lycoming engine and cruises at 160 mph. —(Piper Photo.)

AIR REPORT

(Continued from page 8)

TACTAIR T-3 AUTOPILOT installation on the Piper Apache Twin has been approved by CAA. The pneumatic Tactair weighs only 9 lbs.

MAJOR OVERHAUL PERIOD HAS BEEN DOUBLED for Bell 47G and 47G-2 helicopters, for which 1,200 hours have now been approved as compared to 600 hours previously.

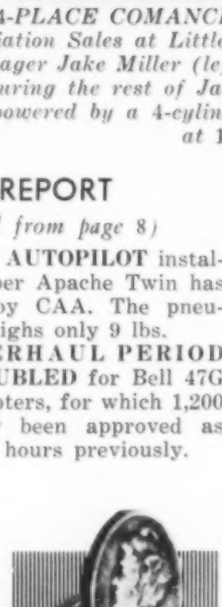
BEECH AIRCRAFT'S FIRST QUARTER sales for fiscal 1958 were $20.7 million as compared to $20.2 million for the same 1957 period and the company expects its 1958 total sales will exceed $95 million, an increase of 24% over 1957 total.

THE U. S. AIR FORCE will have about 80 institutions providing flight training for ROTC students this academic year and the Army will have 50 colleges and universities in its flight training program. During 1957, USAF ROTC students trained totalled 1,246 and Army trained 202. Navy has ROTC flight training at University of Illinois and Purdue on experimental basis where a few dozen midshipmen are learning to fly.

FAIRCHILD M-185 JET BUSINESS TRANSPORT has been shelved.

LEN POVEY has resigned his executive position with Mackey Airlines and is now executive vice president of Aircraft Acceptance Corporation, engaged in aircraft financing and located on Broward County International Airport, Ft. Lauderdale, Florida. Povey will remain on Mackey's board of directors.

PHILADELPHIA AIRPORT'S FIXED-BASE OPERATIONS have been acquired by Ross Aviation of Tulsa, Oklahoma, which will take over the leasing of all hangars as well as gas and oil services on the municipal field. Within six months, plans for a new large hangar will be completed and Ross will establish at Philadelphia a complete aircraft sales and service outlet and a flight school. Joe F. Cannon, company vice president and a national director of the Aviation Writers Association, will head the Philadelphia base. Ross Aviation is nationally known for its advanced flight training program at Tulsa and two military flight training programs it is conducting for the Army. A subsidiary is known for its manuals.



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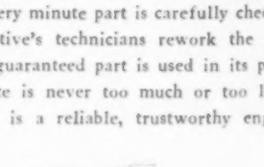

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COPTER SUCCESS

(Continued from page 31)

with provisions for "easy" retrofit of twin turbines, either GE or Lycoming, after those engines are certificated. It expects their availability in 1959 or soon thereafter.

Doman Helicopters reported on its recent sales tour with its machine, which has a 1,950-lb. useful load at a 5,200-lb. gross and is powered by a 400-hp. supercharged Lycoming engine.

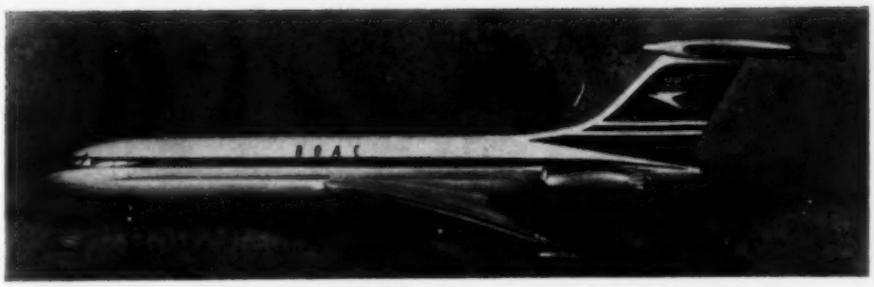
A. W. B. Vincent of Hiller said that company will expand its commercial sales and service activities with deliveries later this year of the new 12D-1, powered by a 310-hp. Lycoming derated to 280 hp. It will gross about 2,700 lbs. and have a 1,020-lb. useful load.

A General Electric report to the meeting pictured promising results from extensive tests with twin T-58 turbines for both Sikorsky and Vertol transports. The two-engine turbine installation weighs 650 lbs. excluding starters but including other accessories and provides a total of 2,048 shaft horsepower. No cost figures were given, but it was indicated that the powerful little turbines will cost about $30 to $35 per horsepower after volume production is achieved. Overhaul costs will be competitive with those of the Rolls-Royce Dart, now widely used on airliners. Dart maintenance is said to be costing about $6 to $7 per hour — the Dart has reached 1,500 hrs. between overhauls.

Lycoming reported its VO-435 helicopter engine is now authorized for 750 hrs. between overhauls instead of 600 hrs. formerly. It said dust is the worst enemy of the helicopter engine.

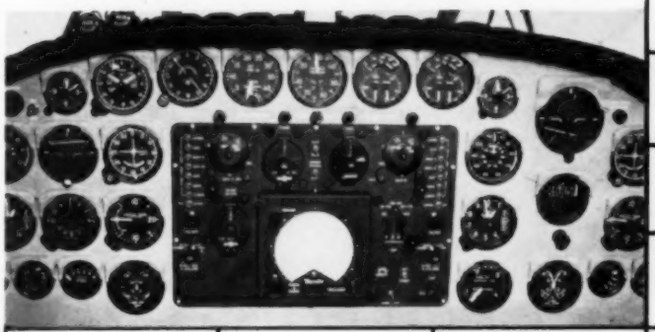
Of major importance was Bell's announcement at the meeting that its 47G and 47G-2 models are now authorized to operate 1,200 hours between major overhauls. This doubles the former overhaul period. No other helicopter has such an extended overhaul authorization.

Much interest was attracted at the meeting by Republic Aviation with its Alouette 2, licensed from Sud Aviation of France. Now CAA approved, the French-built Alouette is the first commercial turbine helicopter ever marketed in America. It is priced at $88,665 with immediate delivery. This is with a Turbomeca Artouste turbine rated at 400 hp. for take-off and 360 hp. maximum continuous. Empty weight is 1,800 lbs., normal gross is 3,300 lbs. and military overload gross is 3,650 lbs. With fuel for a 75-n.m. radius, it can carry 4 passengers—T.A.



NEWEST BRITISH JET AIRLINER is the Vickers VC-10 for delivery and North Atlantic operations beginning in 1963. BOAC has contracted for 35 VC-10's costing $168,000,000 and has an option for 20 more. Four Rolls-Royce Conway jets are mounted near the tail on the fuselage a la Caravelle. The VC-10 will carry up to 150 passengers and was designed for outstanding take-off performance and operational economy. It is the largest airliner of British design.
—(British Information Services Photo.)

COMPLETE ELECTRONIC SERVICE



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FIRST REVERSE THRUST for a production jet airliner has been installed by de Havilland Aircraft in England, using Rolls-Royce reverse-thrust units on outboard Avon engines. DH Chief Test Pilot John Cunningham points to reversal device inside this tailpipe section.
—(de Havilland Photo.)

JUST AMONG OURSELVES

(Continued from page 17)

tion unless the CAB comes through with rate increases at once. It is seriously doubted if the 6.6% increase will be enough to absorb the rising costs and put the airlines in sound enough financial shape to proceed on schedule with their re-equipment programs.

For example, a recent investment bankers survey showed that during the first five months of 1957, revenue passenger miles increased 14 per cent over the year before, but a 20 per cent increase in operating expenses resulted in a 60 per cent decline in net operating revenues. One of the strongest major airlines projects bare coverage of dividends in 1957, actual loss after payment of interest in 1958, and a negative working capital position by the end of 1959. Another line, with a $1.3 million net loss in 1956 and a $2.5 million loss in 1957, has petitioned the CAB for an immediate $18 million-a-year subsidy to offset its critical financial condition. This figure is just a little under the entire annual subsidy bill of all the local airlines which are understandingly on Federal subsidy.

On top of all this the Federal government is now proposing an increase of the Federal tax on aviation fuel. The airlines paid approximately $25 million in fuel taxes in 1957. This compares to an estimated industry-wide profit for the same period of $25 million. If only the first step in the proposed tax increase had been in effect during 1957 the total cost to the airlines would have been $43 million or 72 per cent more than the industry's profit for the year. The Administration tax plan is estimated to run as high as $167 million by 1962! Little wonder the airlines are welcoming a careful Congressional examination of this proposal to up the taxes on aviation fuel.

In a recent interview with Sir George Edwards, managing director of Vickers-Armstrongs and president of the Royal Aeronautical Society of England, we learned that the Russians now have 50 jet transports operating regularly on the Aeroflot schedules. The West has none. Obviously the Russians are as hell bent for leather to play havoc with the free world's airline transportation industry as they are in the realm of missiles and earth satellites.

Insofar as American air carriers are concerned, the Administration and the Civil Aeronautics Board can reverse this situation immediately by reversing their own myopic policies that have brought U. S. air transport to the most dangerous financial crisis in its history. If the Administration and the CAB continue to dilly-dally, then

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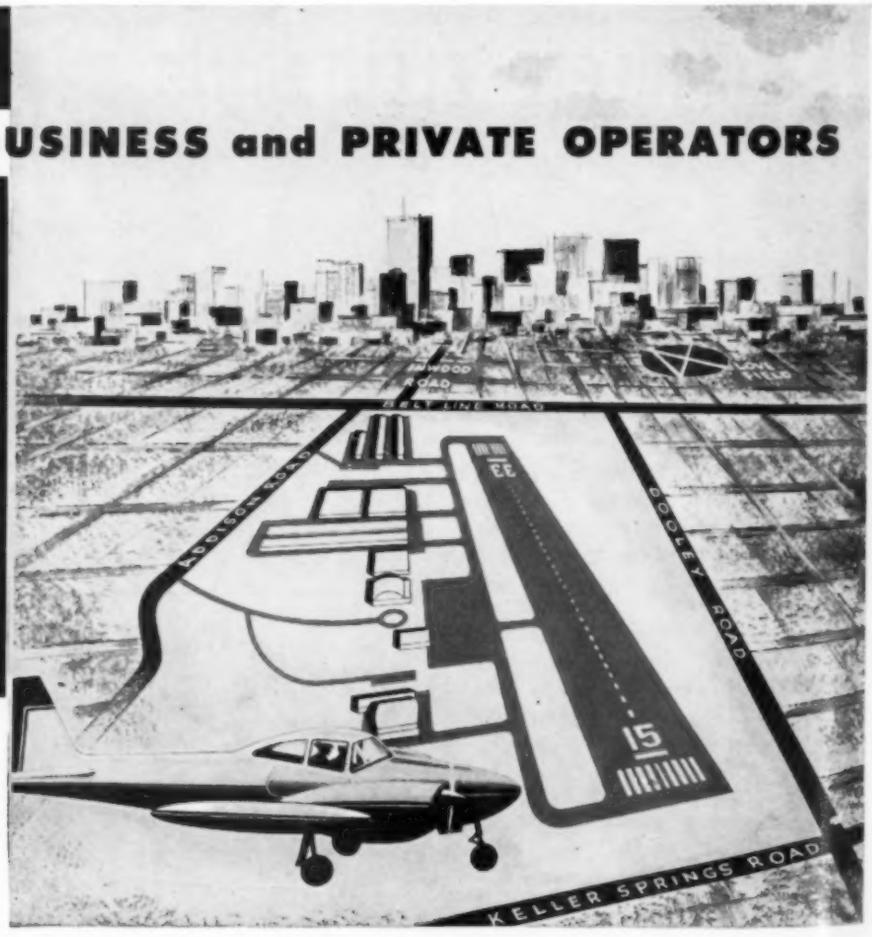

ir last hope is for the Congress to ke over and force the issue.

A Field for Everyone

UNTIL the formation of the National Aviation Education Council and its incorporation into the general framework of the newly re-vitalized National Aeronautic Association, the broad and challenging field of stimulating aviation education has been mostly a hit or miss proposition.

The aviation industry has been primarily concerned with its own problems, especially during the explosive growth of the past twelve years, and has had little time for philanthropy, even when such obvious needs as air age education could be justified on a self-interest basis. So it is that air age education has not enjoyed the support and financial backing of the people and companies who stand to gain most from the intelligent programs and teaching aids devised by recognized leaders and experts in the field of aviation education. Had the aviation industry and the people of the United States listened to the air age education people during the postwar years we would not be facing today the crisis in education so widely publicized and bemoaned since the Russians orbited the first earth satellite.

There are a few rare instances of generous and intelligent support of aviation education deserving real praise and gratitude. For example, the Cessna distributor for Southern California, Larry Hunt, two years ago made a gift of a new 170 to W. Earl Sams, consultant in secondary education for the California Department of Education. Mr. Sams put 675 hours on the plane as a flying laboratory and in his official travel. The plane was recently sold and the proceeds turned over to

FIRST SINGLE-ENGINE PLANE TO CROSS SOUTH POLE was this de Havilland Otter of the British Commonwealth Trans-Antarctic Expedition. It crossed the Pole on an 11-hr., 1,000-mile hop from South Ice to McMurdo Sound. This same Otter has also crossed the North Atlantic. U. S., Canadian, Chilean, Norwegian, Indian, Australian, New Zealand and Japanese forces use single-engine Otter and DH Beaver aircraft.

—(de Havilland Aircraft Photo.)

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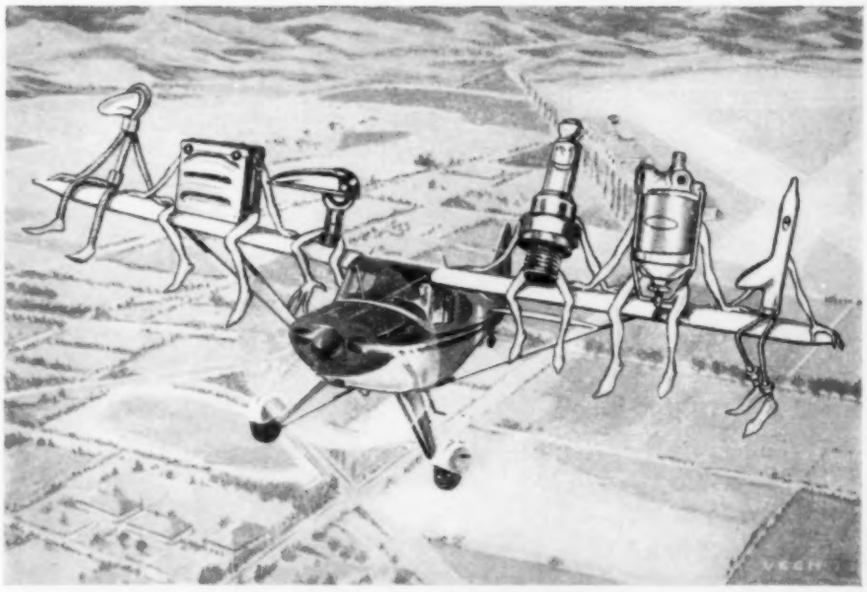

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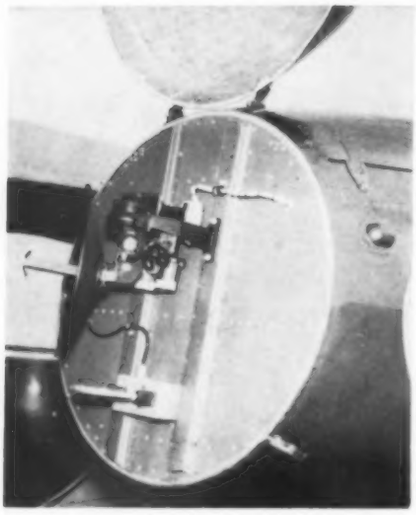

Here's RCA AVQ-50 antenna on Beech D18S. Note glideslope antenna is also on bulkhead. McMillan Radome hinges at top.

Our latest radar installation is the most significant of all— an RCA AVQ-50 lightweight radar in a Beech D18S.

With the radar, ASSOCIATED RADIO installed in the nose a 750-VA inverter. The dome is from McMillan. Emphasis is on easy access to instruments and radio equipment through a nose accessory hatch for easy maintenance.

This pioneering installation is another reason why ASSOCIATED RADIO is the nation's leader in custom avionics and aircraft radio. We solicit your work and guarantee to service every installation we make. Call us now—or drop by to see us.

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Mr. Hunt, who is providing the department with a new 1958 model. We need support of the NAEC at the national level and we need more Larry Hunts to help aviation education at the local level; for unless we go to work in our own communities and respective states we can expect the encroachment of the Federal government in the field of education where it simply doesn't belong.

Within a few weeks a bulletin will be forthcoming from the University Aviation Association that will show how state aviation education councils can be organized and accepted programs of air age education put into action. The plan was worked out by a group of far-sighted educators and aviation people in Iowa. Copies will be available free of charge from Harold Wood, secretary, University Aviation Association, Parks College of St. Louis University, East St. Louis, Illinois.

For those who can not serve on the local or state level, active membership in and support of the National Aviation Education Council is a must. These people are with the NAA at 1025 Connecticut Avenue, N. W., Washington 6, D. C. It's the biggest bargain in aviation because the satisfaction that comes from being a part of the program can't be priced in dollars. Aviation education is a field everyone can participate in.

ALTI-CRUISER

(Continued from page 26)

the door latch and two each locking top and bottom of the door to the structure. In addition to cabin structural beefing, cabin skin is of a heavier gauge than in the 680.

The sealed cabin of the Alti-Cruiser prototype was subjected to 2,000 cycles of pressurization in proof-testing it for CAA certification. Each cycle represented a separate flight, so that this amount of testing provided the equivalent cycling of a minimum of 5,000 hours of pressurized flying and an average of something like 9,000 hrs. if 4.5 hrs. for a typical flight is assumed.

While cabin pressures become impressive when applied to the large areas of glass, side-panel, headliner and other areas of the cabin — the door, for an example of a single unit, withstands a force of two tons during pressurized flight — the Alti-Cruiser's pressure differential of 2.0 to 2.3 lbs. per sq. in. is relatively low when compared with that of large airline transports. The new jet airliners, for example, have differentials going up as high as

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8 lbs. per sq. in. — larger aircraft can afford a greater weight penalty for pressurization.

The Alti-Cruiser's compressor provides a flow of about 20 lbs. per minute as compared to about 60 lbs. per min. for a similar unit in the Convair airliner. Being smaller than the system in airliners and providing less pressurization, the Alti-Cruiser's pressurization system is more comparable to that used in military aircraft and their small cabins and cockpits. In fact, all of the devices used in the Alti-Cruiser have had many thousands of hours of proven dependability and operation in military aircraft. All are top-quality devices meeting airline requirements. Here are the Alti-Cruiser's units:

(1) Stratos S-20 cabin supercharger, from Stratos Division of Fairchild.

(2) It is powered by a Sunstrand hydraulic motor, from Sunstrand Aviation Division, Sunstrand Machine Tool Company, manufacturers of the famous Sunstrand constant-speed drive units widely used in larger aircraft.

(3) The hydraulic system, using fire-resistant Skydrol safety fluid from a 5-gal. reservoir, is powered by two variable-delivery engine-driven Stratopower pumps, from New York Air Brake's Stratopower Division. These pumps are geared to operate at 1.08 times engine crankshaft speed, thus turning about 3,600 rpm. with take-off power and 2,800 rpm. with cruising power. They consume about 7 to 9 horsepower each from aircraft engine power, or a total of 14 to 18 hp. from the two 340-hp. Lycomings.

It is interesting to note that this power diversion, while not significant, has been offset on the Alti-Cruiser by refinements to the airplane's aerodynamic cleanness through two methods of drag reduction — (a) flush-mounting or submerging of antennas inside both wingtips and the vertical fin cap and (b) a carefully built-up exterior paint job such as used to smooth out the exterior surfaces of racing aircraft, build-up material being applied for smoothness over all the surface before the paint is applied.

(4) Stratos BUR-20 expansion turbine boot-strap refrigeration cooling unit, from Stratos Division, Fairchild.

(5) AiResearch automatic cabin pressure control equipment from AiResearch Division, Garrett Corporation.

(6) Barber Coleman Micro-plus integrated control system for all system controls. This maintains selected cabin temparture at a constant value, regardless of outside air temperature.

(7) Janitrol 40,000-BTU combustion heater. While this is the rating of the heater, the system has a 52,000-

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Speeds Sales and Service by SEAPLANE

George Engine Company of New Orleans now speeds sales and service calls with a Cessna 180 seaplane on Edo floats. With a ramp and hangar on the Intracoastal Canal right in back of their main offices and shops, George Engine personnel can fly in minutes to rigs throughout the area. Sales Manager Herb Colby says, "Our new plane has enabled us to give much better and faster sales and service coverage to our customers on the Gulf Coast. It is one of our most important sales aids."

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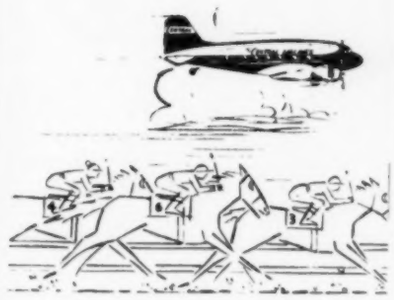

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BTU rating because it also utilizes heat of the compressed air when desired.

The Alti-Cruiser's pressurization and air-conditioning system features flexibility and simplicity of pilot's control, with emphasis on a dual-system set-up so that (1) cabin pressure is automatically controlled by two separate systems, (2) cabin may be air-conditioned by use of either ram air or the cabin supercharger and (3) dual hydraulic drive is provided by the use of a hydraulic pump on each engine.

Outside air for the compact cabin package behind the baggage compartment is taken in through a scoop atop the fuselage just behind the wing center section. Most of this air is ducted through the system's heat exchangers and then exhausted out through the bottom of the rear fuselage. Only a fraction of the incoming air goes through the supercharger and into the cabin.

The pilot's controls enable him to climb or descend the cabin independently of the aircraft's climb or descent. The cabin rate of pressure change is automatically limited to any desired rate between 0 and 2,000 fpm. This rate is selected on a dial, which is also used to select cabin altitudes ranging from 5,000 to 7,000 ft. less than aircraft altitudes. Automatic control of cabin temperature is accomplished without readjustment of controls during all phases of flight operation.

Automatic sequencing of all equipment is a feature of the air-conditioning and pressurization system. A pressurization system schedule may be established before take-off so that cabin conditions are automatically controlled according to this schedule during flight, but system flexibility is provided so that all automatic controls may be operated or over-ridden as desired. In addition to the cabin pressure controller and a five-position air condition selector switch, the pilot is provided immediate control over all operations by a pressurization master switch, a de-fog switch and a heater switch. The five-position condition selector switch has two positions for flight operation, two positions for ground operation and "off." Flight automatic position allows automatic operation of all pressurization equipment. The other flight position is for ram air, which is used for automatic in-flight heater operation without pressurization. Ground cooling and ground heating positions are provided for supercharger operation on the ground.

During flight pressurization, two valves work to keep the cabin pressure within limits. One prevents cabin pressure from dropping below 2.0 lb and the other prevents it from exceeding 2.3 lbs. The cabin and its windows have been proof-tested to twice the differential pressures this provided, failures having been purposely caused to latch down the ultimate differential at 4.7 lbs. per sq. in.

During flight tests with the prototype, the effectiveness of its refrigerated air conditioning was demonstrated on many occasions last summer. On one hot day last July, the airplane was held at the end of the runway with ambient air temperature at a blistering 112 degrees. Within less than 2 minutes after the pressurization was turned on, the cabin air temperature was down to a cool 80 degrees.

News of the Alti-Cruiser's availability was greeted with numerous $15,000 deposits for orders from Aero Design's 25 distributors. President George Pew and Vice President Bob White said the volume of advance orders exceeded their expectations. Justifiably proud of the Alti-Cruiser's accomplishments, Ted Smith considers it a more significant stride in business plane progress than engine supercharging.

"This is the starting point for genuinely efficient, comfortable, all-weather business flying," Smith pointed out. "There is nothing experimental about it because it uses systems and equipment already thoroughly proved. Anything exceeding the Alti-Cruiser will have to be a more powerful and heavier airplane. This will come with increased demand for larger pressurized airplanes. Until then, the Alti-Cruiser is the optimum for practical, efficient and economical flying."

It is available with two cabin arrangements, one with four individual seats and a lavatory compartment walled off at the rear of the cabin and the other with six seats. New interiors feature built-up upholstery panels for easy removal, new track-mounted

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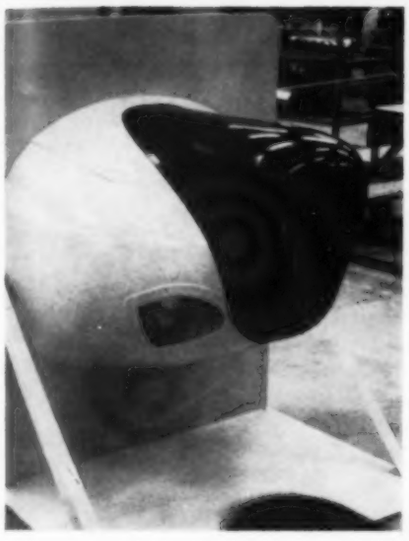


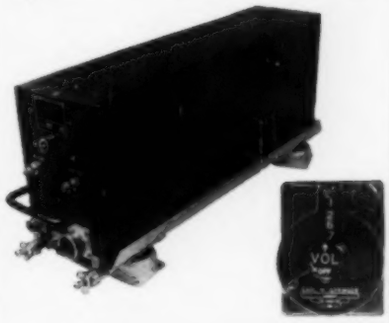
RADOMES FOR AERO COMMANDERS include complete nose on an elaborately-instrumented Army Commander above, which also has long antenna board outside of fuselage, and small radome for RCA's AVQ-50 radar (left). Alti-Cruiser's elimination of nose lights will make possible larger nose radome.
—(FLIGHT MAGAZINE Photos.)

seats with retractable arm rests for increased aisle space and a new standard for cabin quietness, achieved through pressurization. The cockpit features a completely new and unitized panel, with completely dual instrumentation and separate panels for pilot and co-pilot and engine panel, and with a new control pedestal and new control wheels. Airline-type in its completeness, the new cockpit is a model of thorough attention to pilot needs and effective presentation.

So completely equipped is the Alti-Cruiser that there are only four major items on the optional list of equipment to be added. These are RCA AVQ-50 radar, for which the wiring is already provided; de-icing boots, propeller alcohol anti-icing system and auto-pilot system. An oxygen system is standard equipment even though the Alti-Cruiser is pressurized.

Performance and specification details as released by the factory accompany this article. They do not specify an empty weight, but it is expected to be about 4,900 lbs. At a 7,000-lb. gross, this provides a 2,100-lb. useful load. The 680 Commander's useful load at 7,000-lb. gross is 2,750 lbs., its empty weight being 4,430 lbs., or about 500 lbs. less than that of the Alti-Cruiser. This represents the weight of pressurization provisions and radio and other equipment included as standard in the Alti-Cruiser. The weight price of about 300 lbs. for pressurization and air-conditioning is actually less than the weight of two passengers in payload.

$1785.00



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